



# Virtual Network Services

## **Product Managers**

Deepak Bhargava – Network Analysis Module

Vijay Iyer – Wide Area Application Services

Joe Dillon – Virtual Service Datapath (vPath)

**Cisco Confidential**



## Nexus 1000V Public Webinar Series

Date	Business Sessions
22-Mar	Nexus 1000V Family Overview and Update
5-Apr	Virtual Network Services (vPath, NAM, vWAAS)
19-Apr	Virtual Security Gateway Introduction
3-May	Journey to the Cloud w/ N1KV: vCloud Director & Long Distance vMotion
17-May	Secure VDI with Nexus1000V & VSG

Date	Technical Sessions
29-Mar	Nexus 1000V New Features and Installation Overview
12-Apr	Nexus1010 Installation & Upgrade
26-Apr	Virtual Security Gateway Installation and Basic Configuration
10-May	Nexus 1000V Advanced Configuration
24-May	Nexus 1000V Troubleshooting

# Virtual Network Services

## Today's Agenda

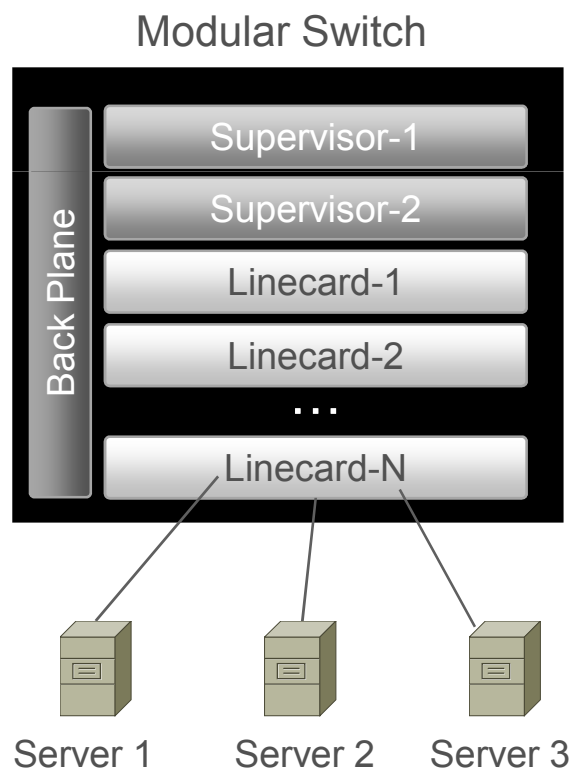
- Nexus 1000V Architecture – Joe Dillon
  - Virtual Supervisors and Ethernet Modules
  - Virtual Service Datapath (vPath)
- Network Analysis Module (NAM) – Deepak Bhargava
  - Prime NAM for the Nexus 1010
- Virtual Wide Area Application Services (vWAAS) – Vijay Iyer
- Q &A

# Nexus 1000V Architecture Overview



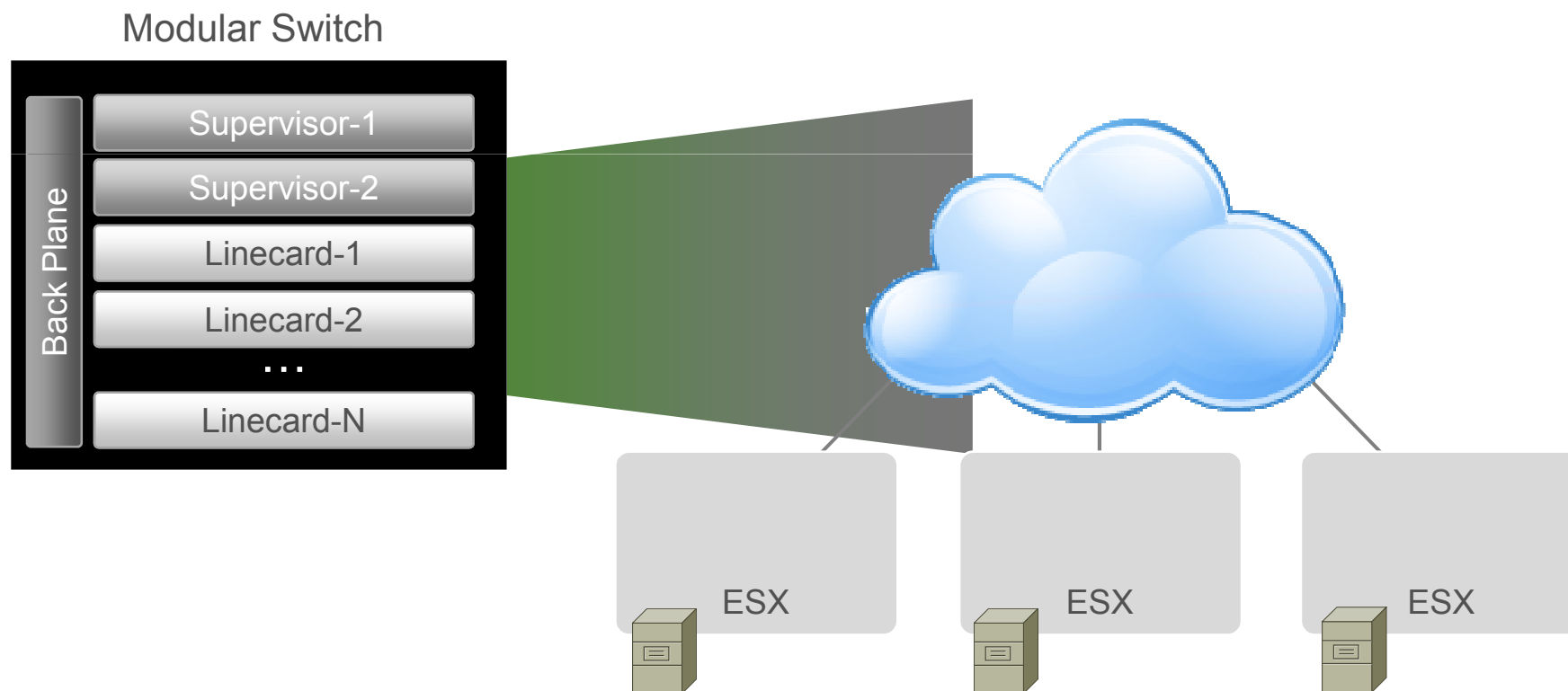
# Nexus 1000V Architecture

## Comparison to a Physical Switch



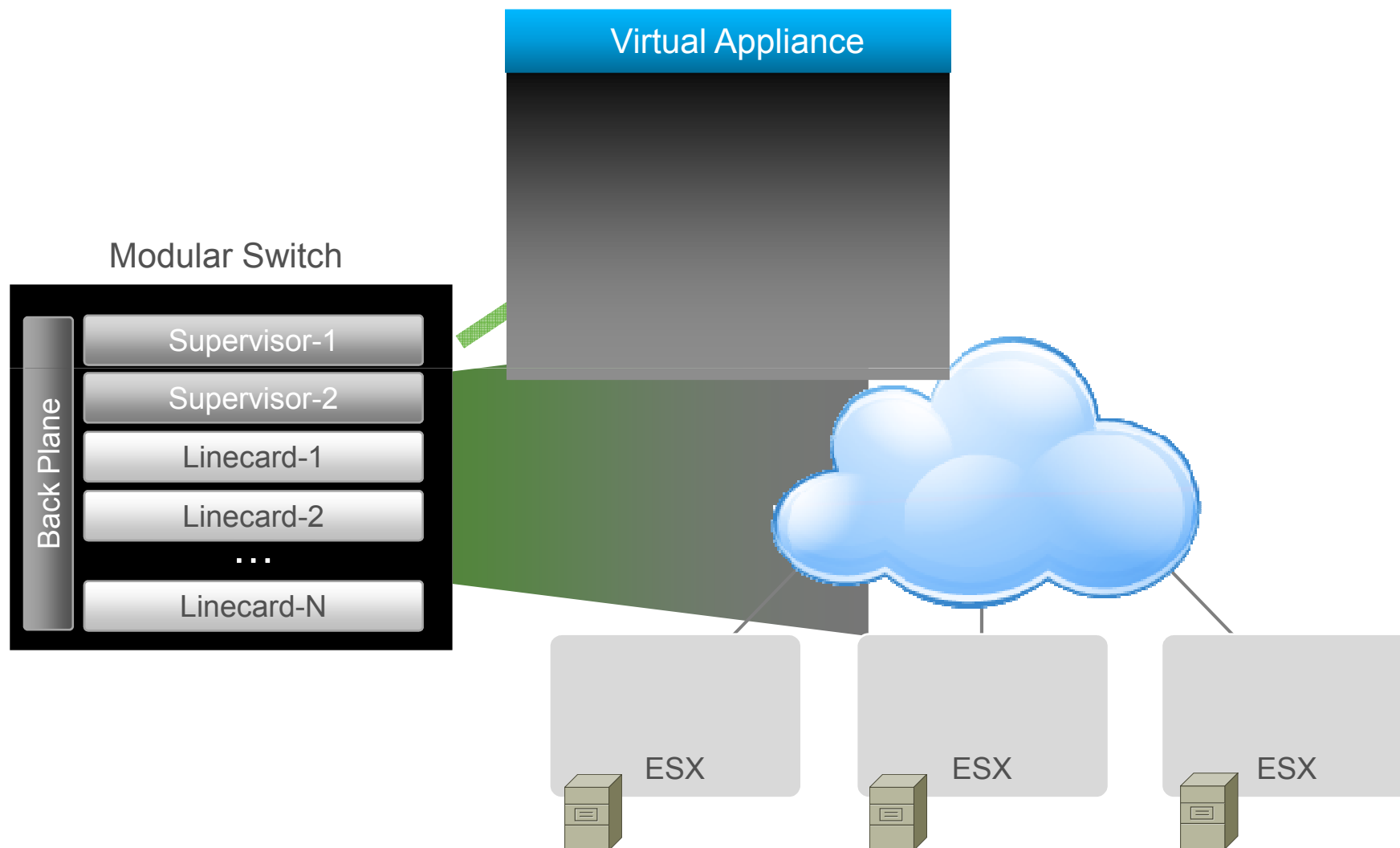
# Nexus 1000V Architecture

## Moving to a Virtual Environment



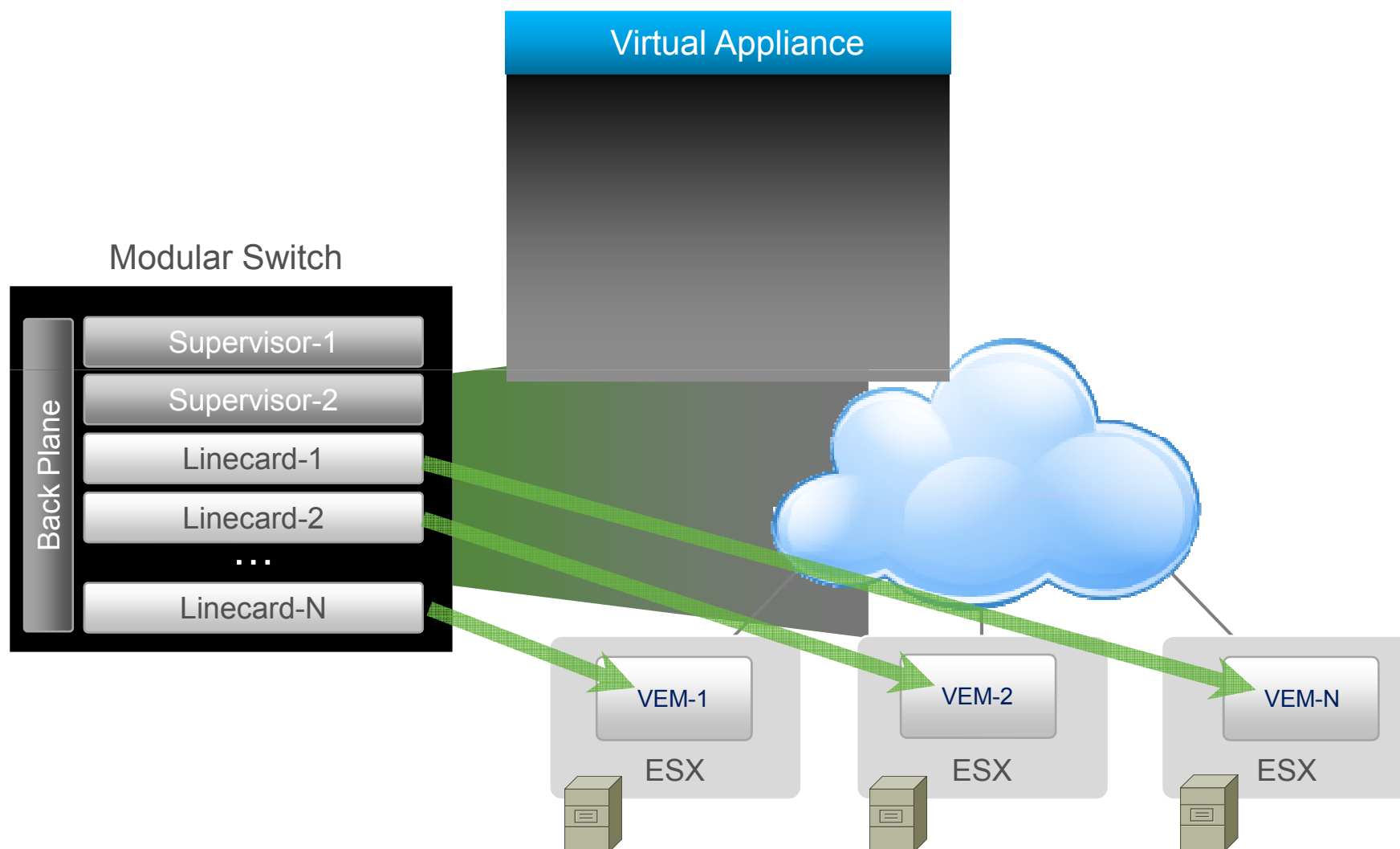
# Nexus 1000V Architecture

Supervisors → Virtual Supervisor Modules (VSMs)



# Nexus 1000V Architecture

Linecards → Virtual Ethernet Modules (VEMs)

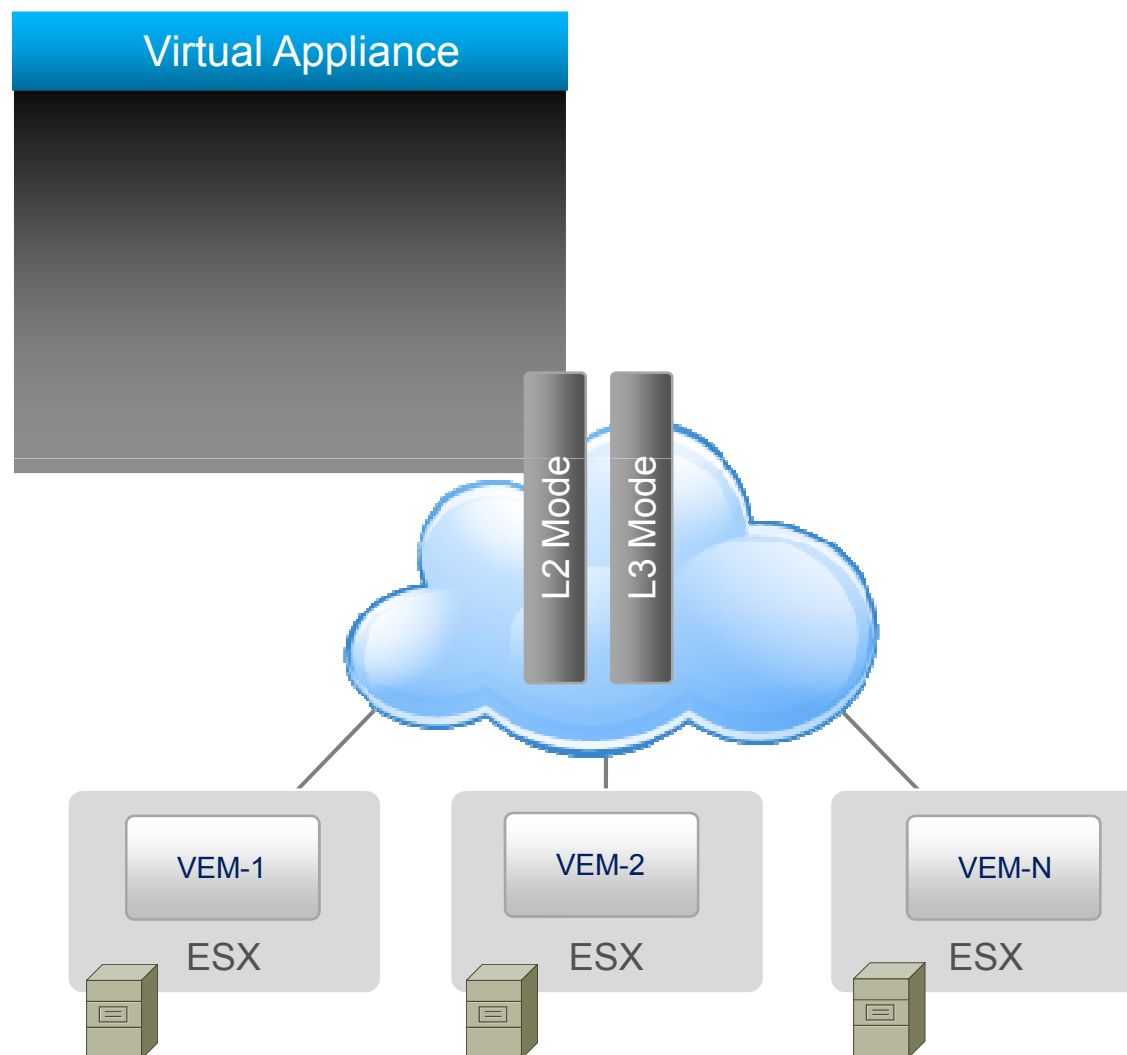




# Nexus 1000V Architecture

**VSM + VEMs = Nexus 1000V Virtual Chassis**

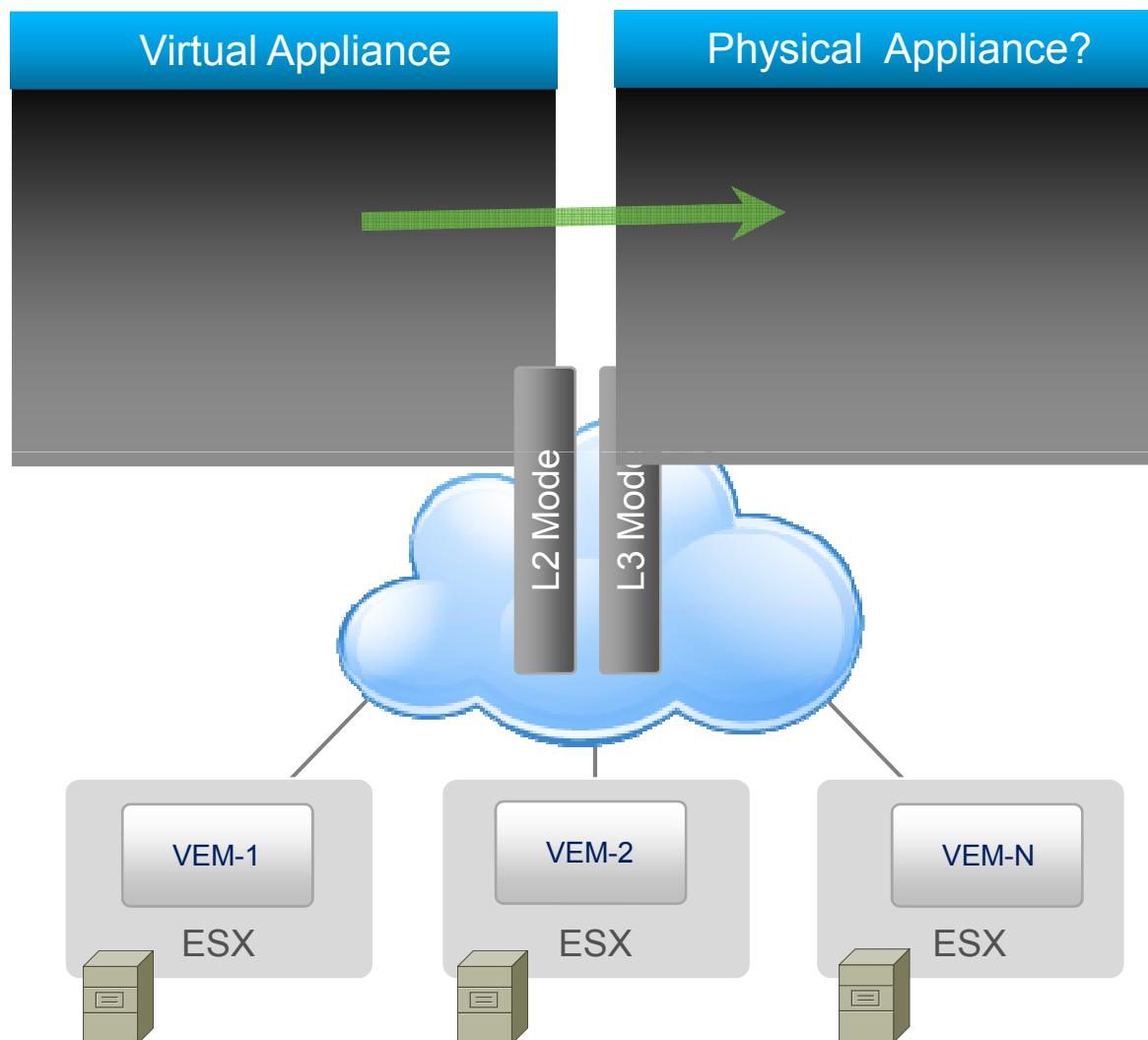
- 64 VEMs per 1000V (connected by L2 or L3)
- 200+ vEth ports per VEM
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter



VSM: Virtual Supervisor Module  
VEM: Virtual Ethernet Module

# Nexus 1000V Architecture

## Customer Request: Host VSMs on a Physical Appliance



- 200+ vEth ports per VEM
- 64 VEMs per 1000V
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter

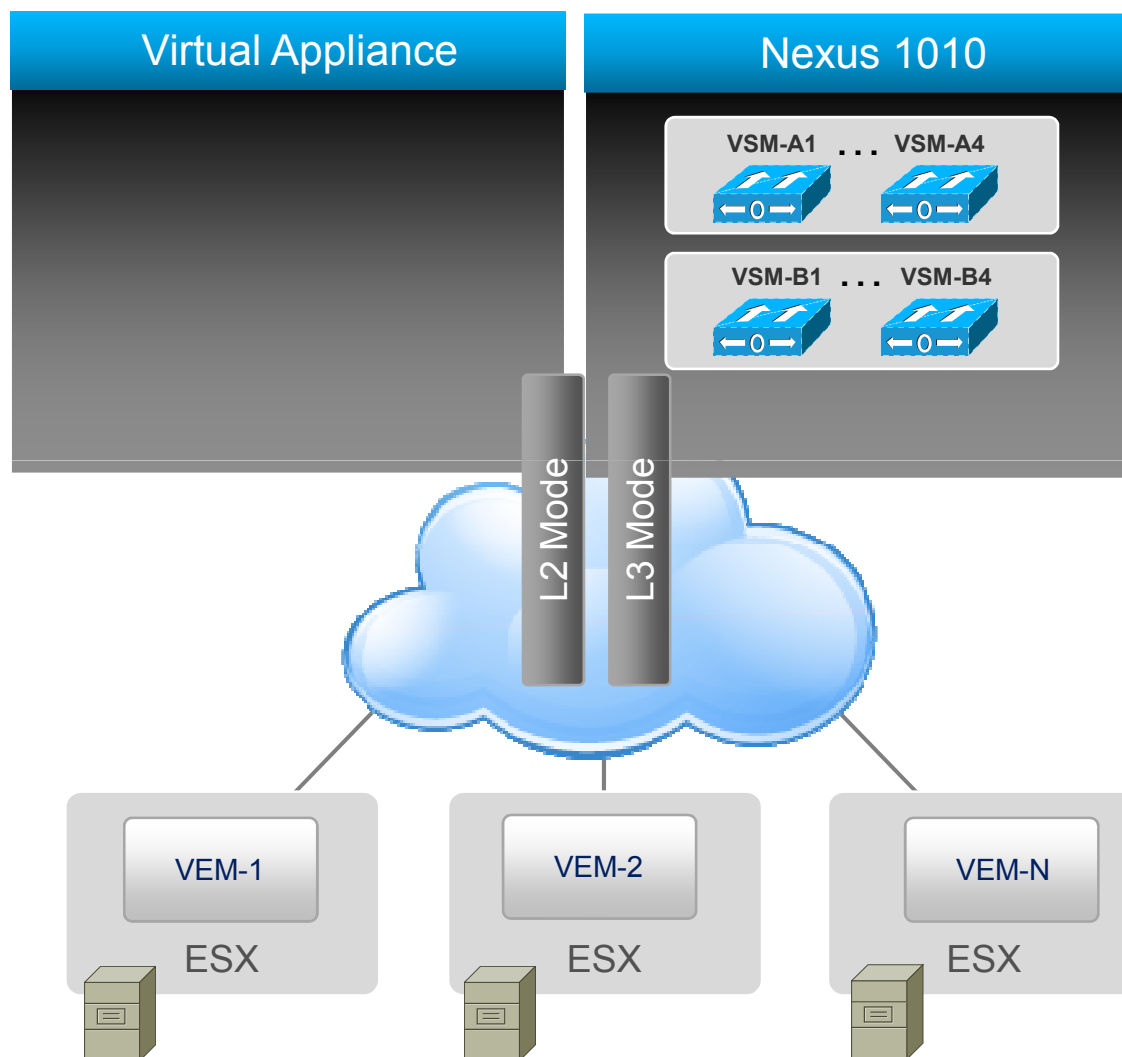
VSM: Virtual Supervisor Module

VEM: Virtual Ethernet Module

# Nexus 1000V Architecture

## VSMs hosted on a Physical Appliance: Nexus 1010

- Up to 4 VSMs per Nexus 1010
- Nexus 1010s deployed in redundant pair

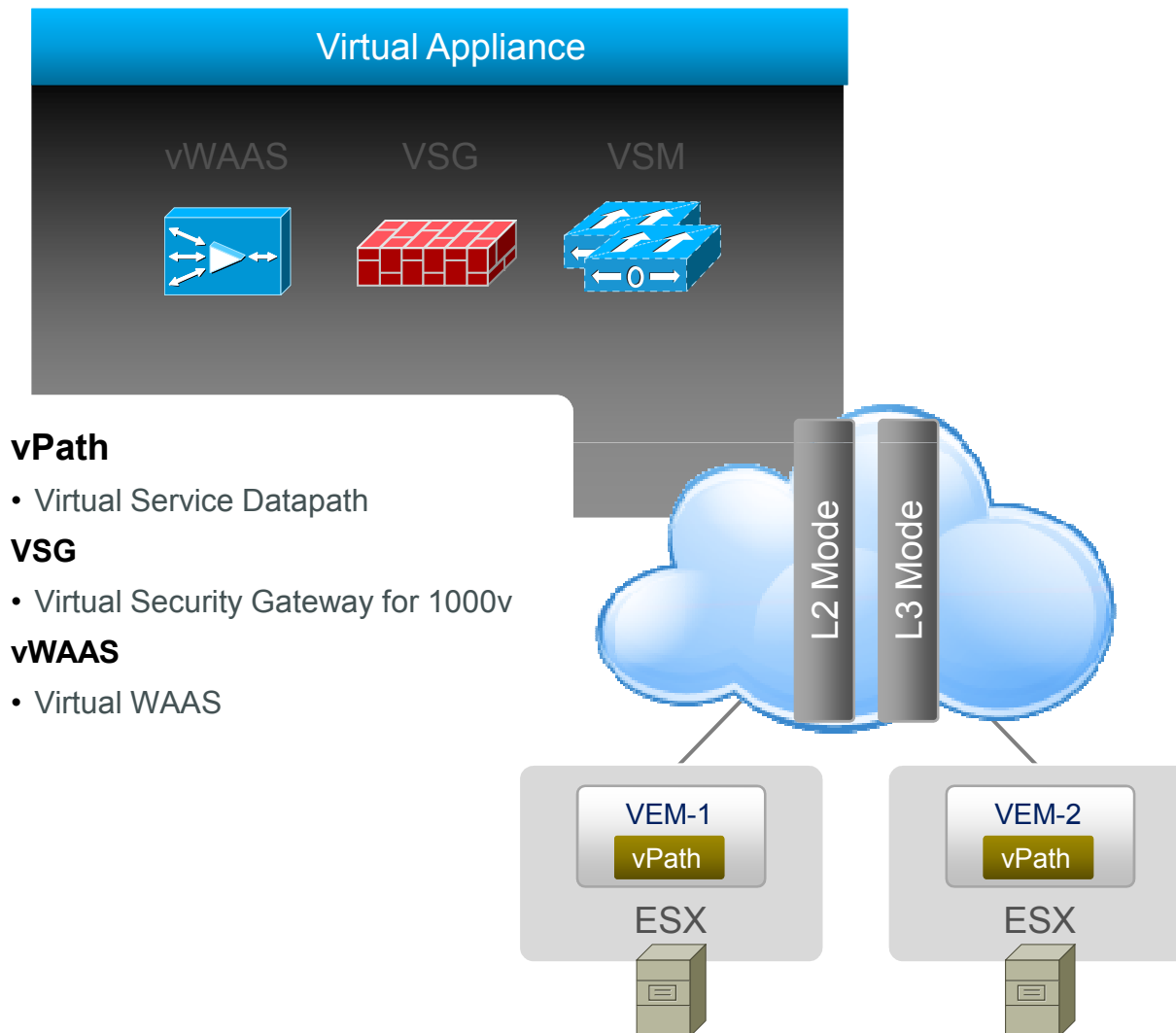


- 200+ vEth ports per VEM
- 64 VEMs per 1000V
- 2K vEths per 1000V
- Multiple 1000Vs can be created per vCenter

VSM: Virtual Supervisor Module  
VEM: Virtual Ethernet Module

# Embedding Intelligence for Virtual Services

## vPath – Virtual Service Datapath



### vPath

- Virtual Service Datapath

### VSG

- Virtual Security Gateway for 1000v

### vWAAS

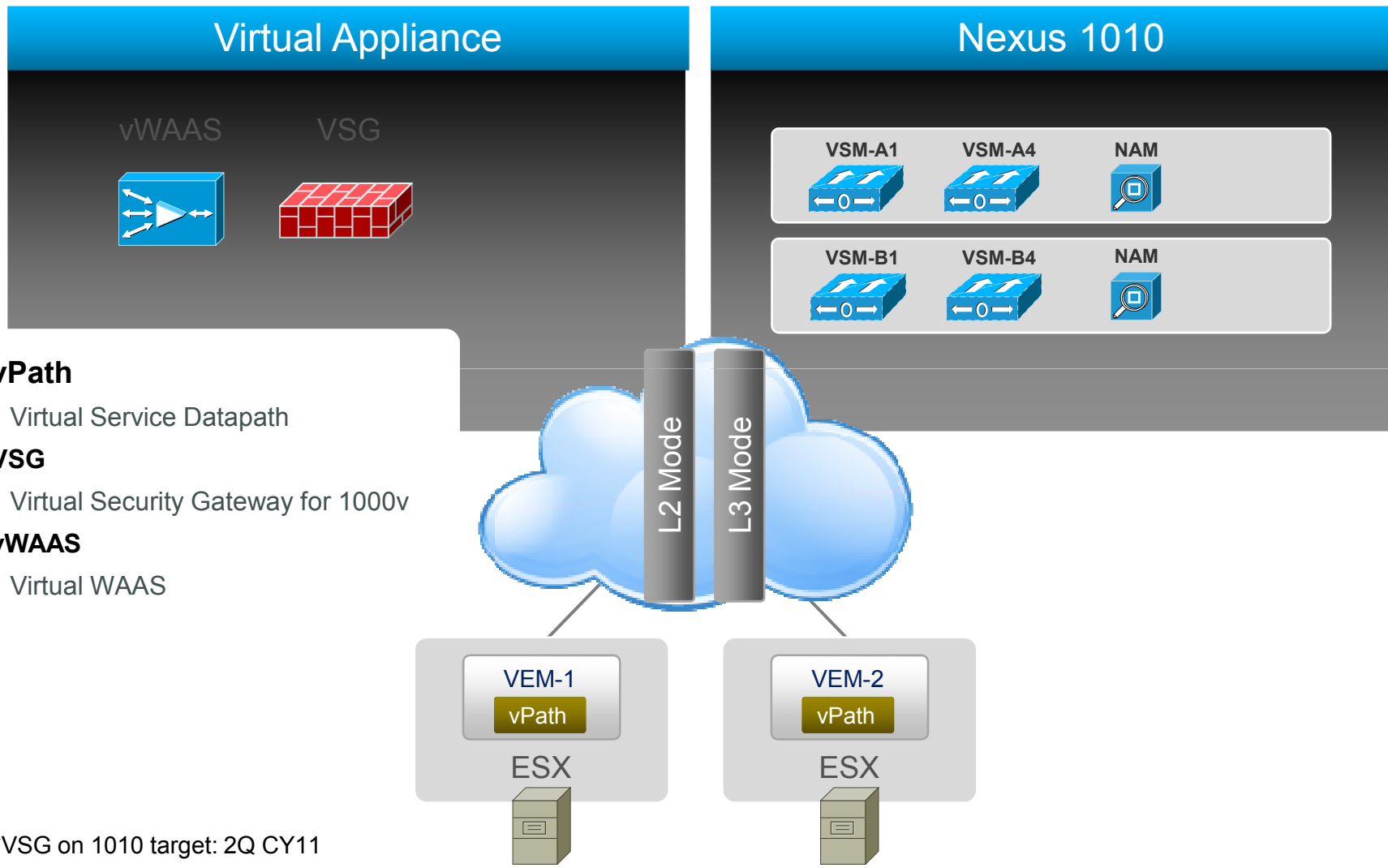
- Virtual WAAS

### vPath

- Traffic Steering
- Fast -Path Offload

• **Nexus 1000V ver 1.4 & above**

# Nexus 1010 – Hosting Platform for Services



## vPath

- Virtual Service Datapath

## VSG

- Virtual Security Gateway for 1000v

## vWAAS

- Virtual WAAS

\*VSG on 1010 target: 2Q CY11

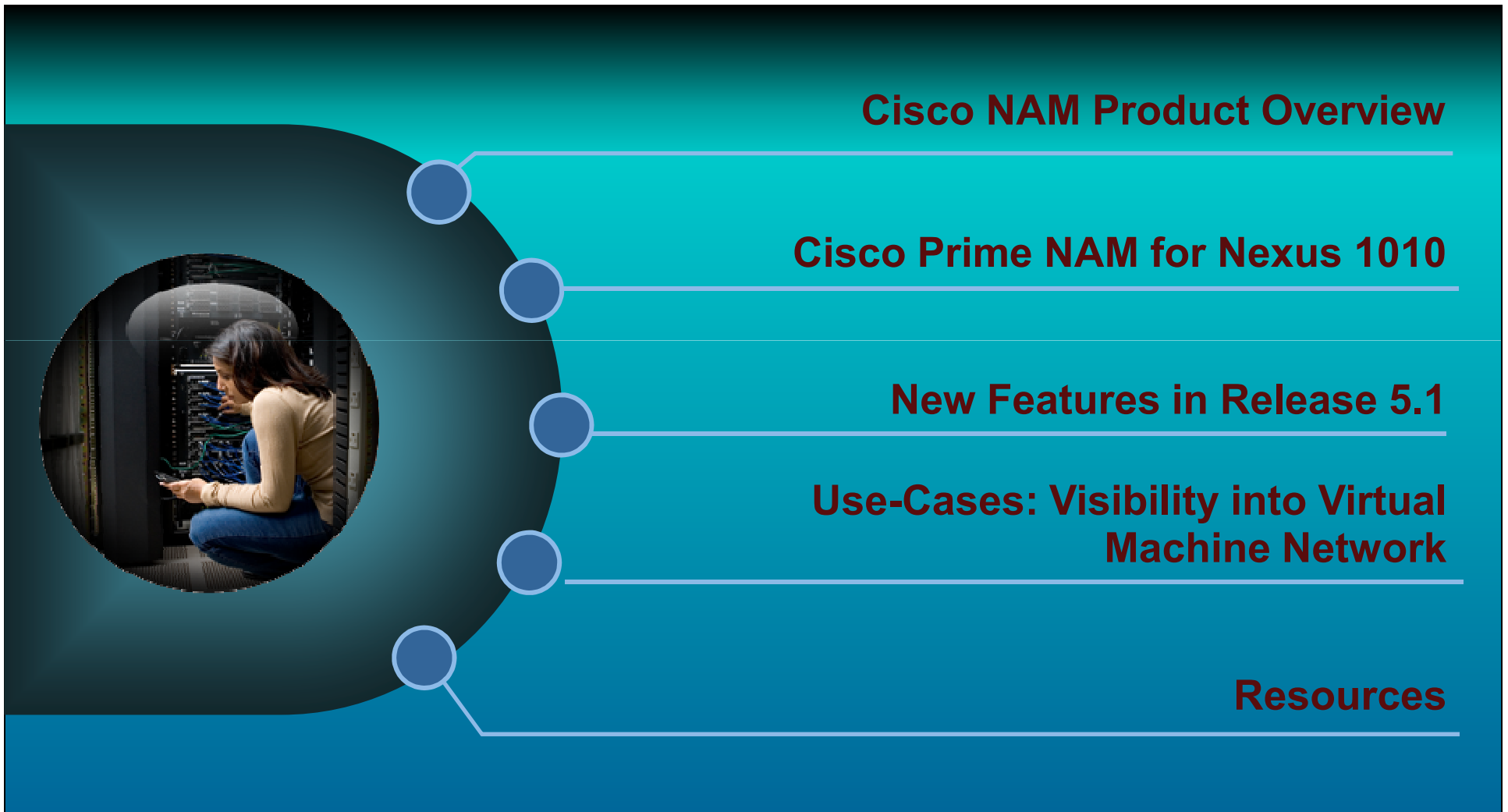
# Virtual NAM

Product Update - Cisco Prime  
Network Analysis Module (NAM)  
Software 5.1 for Nexus 1010

## **Product Manager**

Deepak Bhargava – Network Management

# Agenda

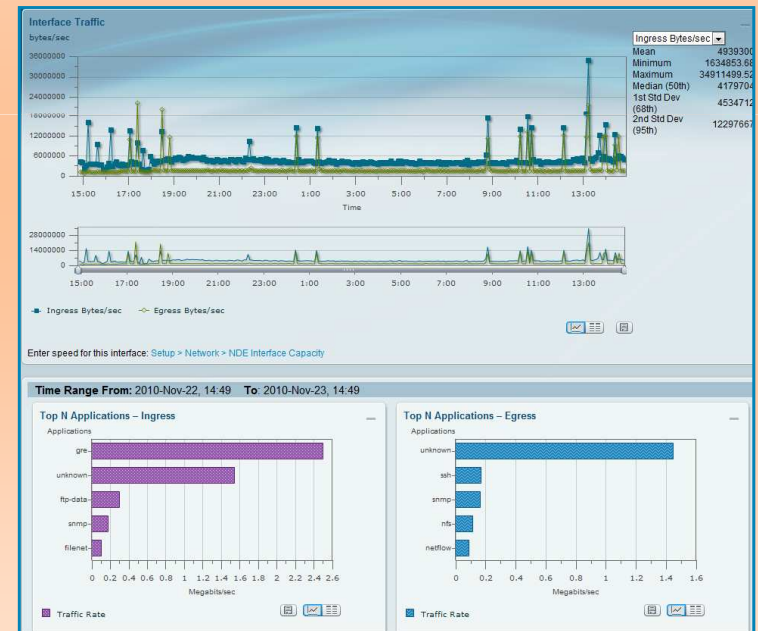


# Cisco NAM Overview

## Network Traffic and Performance Analysis

Deliver network visibility to optimize resources, troubleshoot performance issues, and ensure consistent end-user experience

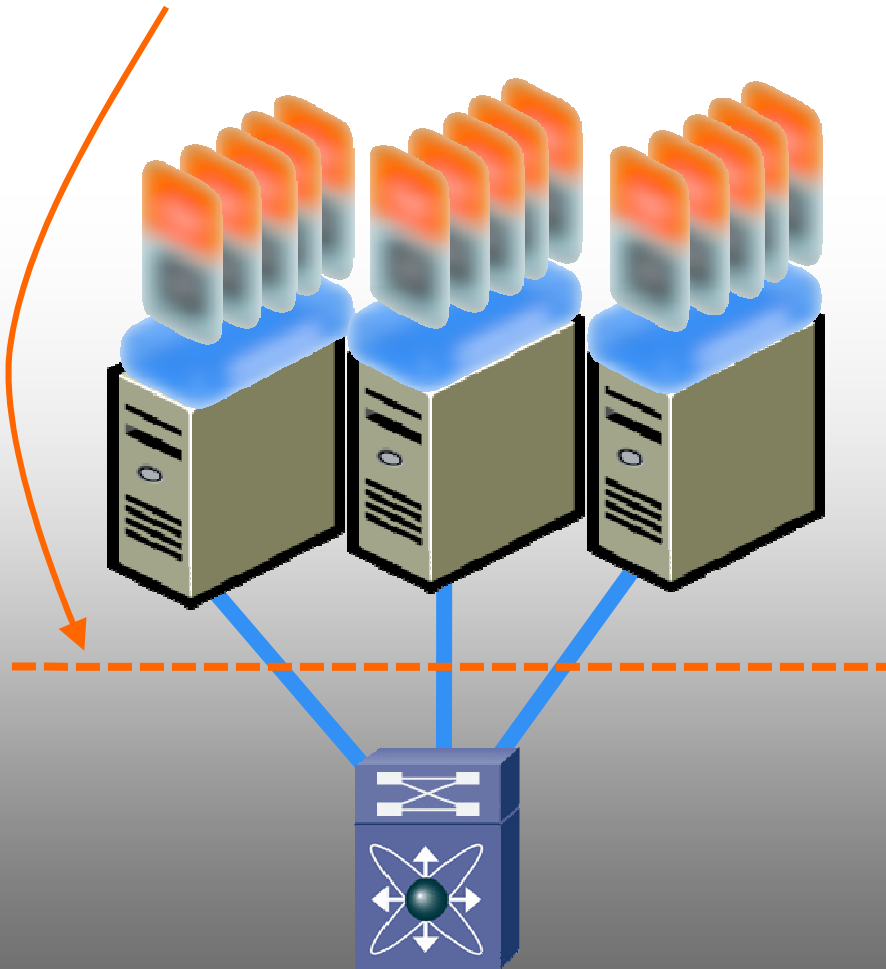
- Improves operational efficiency
- Provides enhanced application performance visibility across the network
- Reduces total cost of ownership





# The Challenge: Server virtualization creates a demand for VM-level visibility

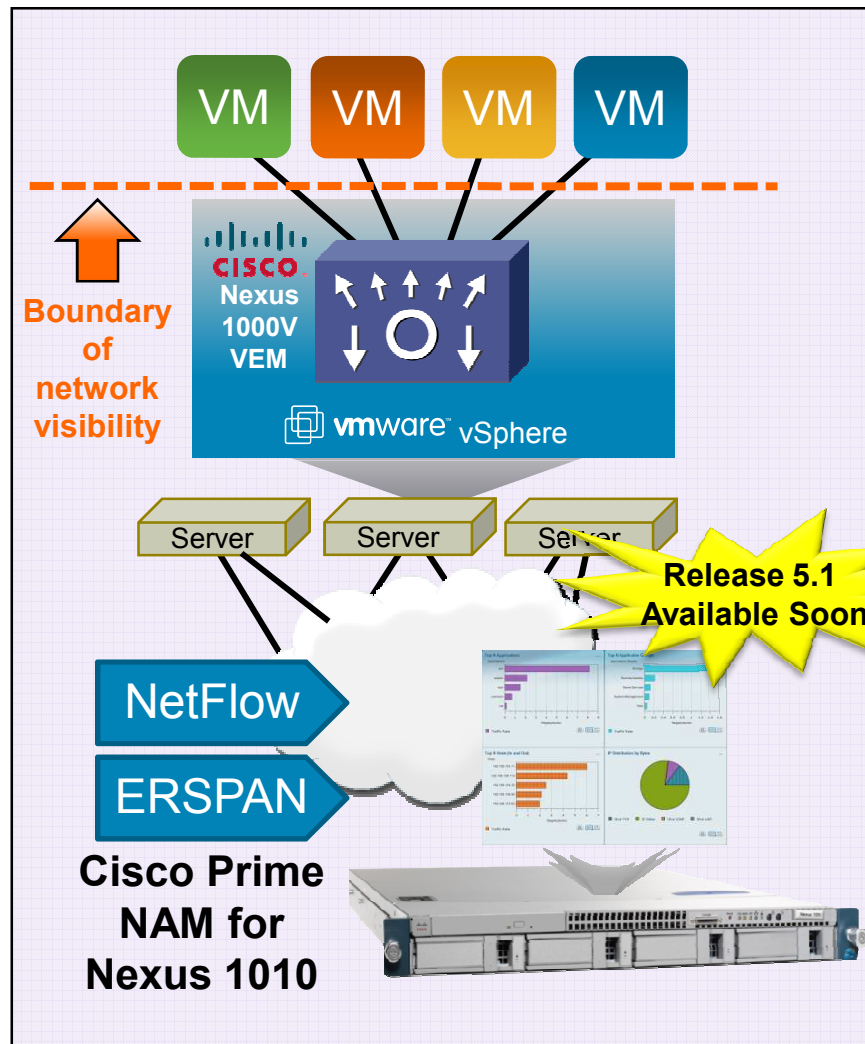
Boundary of network visibility



- Lack of visibility into network behavior at the VM level
- Lack of visibility into cross-VM interactions
- Need for operational consistency and continuity across physical and virtual network

# Visibility into Virtual Machine Network

Cisco Prime NAM integrates with Nexus 1000V switch infrastructure



- Extend operational visibility to virtual switching layer
- Assess impact on network behavior due to changes such as VM migration, port profile update, etc.
- Monitor VMs while they migrate with VMotion

# New Features in Release 5.1



# Cisco Prime NAM for Nexus 1010

## Software Release 5.1 Features

Historical Analysis

Interactive Reports

Nexus 1000V 1.4  
support

Analysis workflows

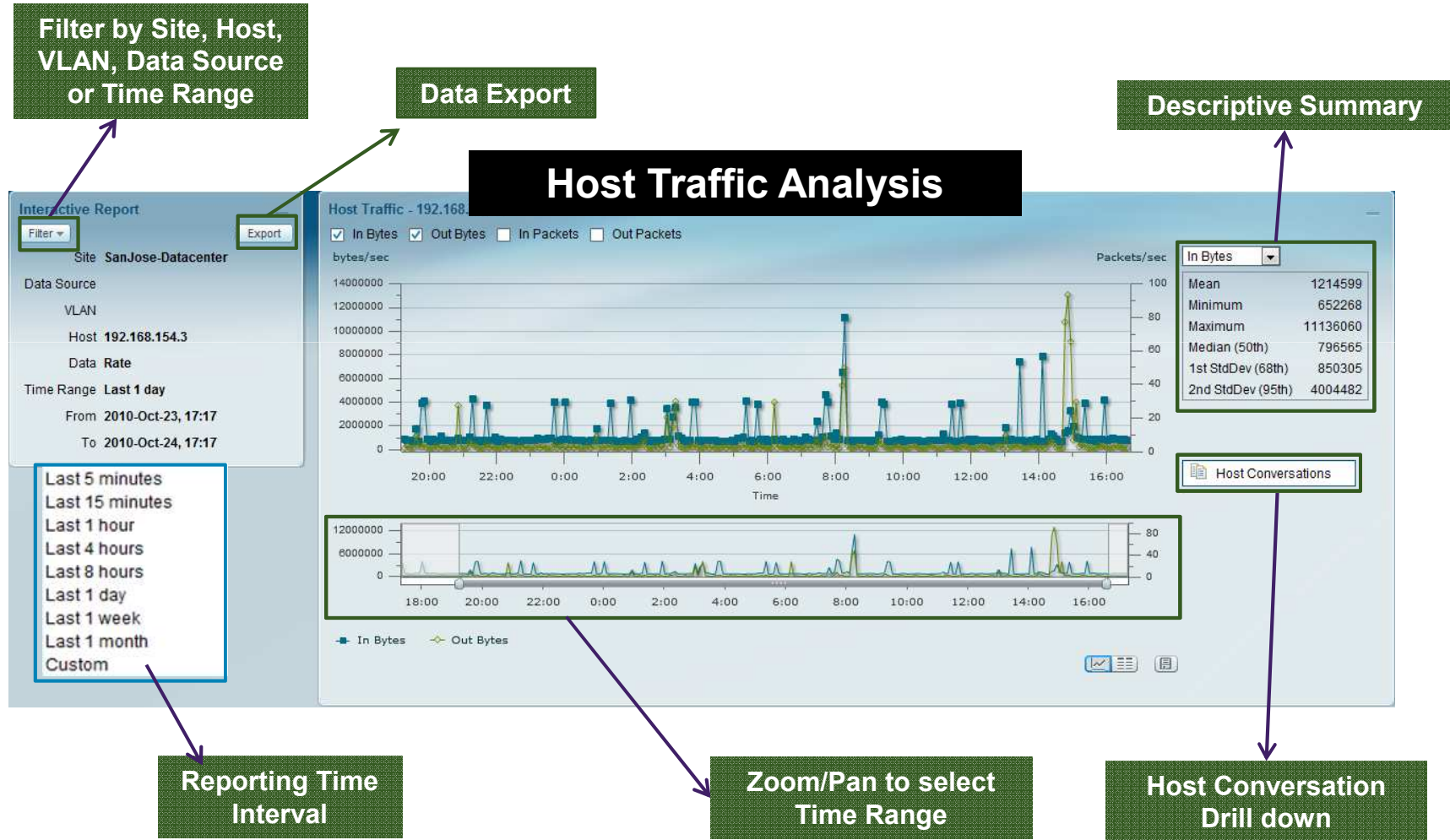
Standards-based API

Packet Capture,  
Decodes and Error  
Scan



# Interactive Reports

## Quick Access to Actionable Information



# Analysis Workflow Example

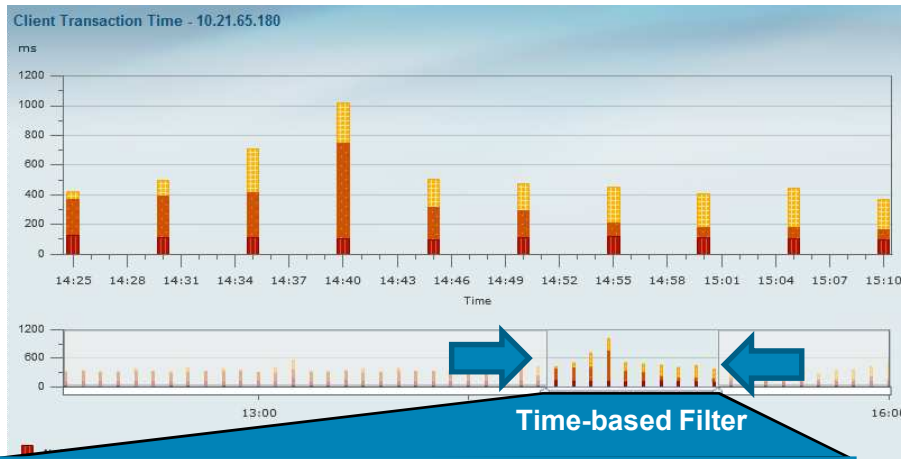
## Quickly respond to performance trouble-tickets



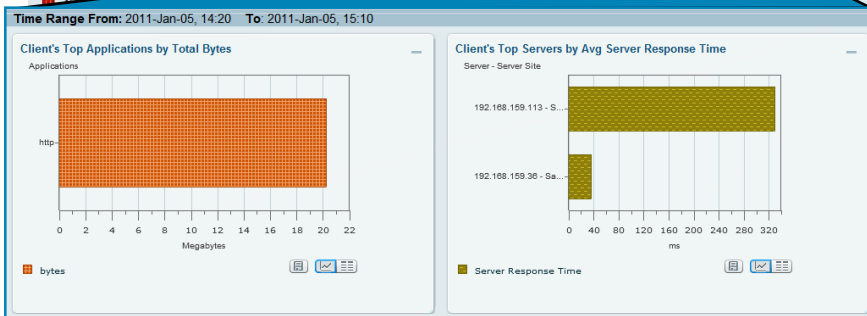
**Client: 10.21.65.180**  
**Application: http**  
**Reporting Time Range: Last 4 hours**  
**Site: San Jose Campus**

# Analysis Workflow Example

## Quickly respond to performance trouble-tickets



Client: 10.21.65.180  
 Application: http  
 Reporting Time Range: Last 4 hours  
 Site: San Jose Campus



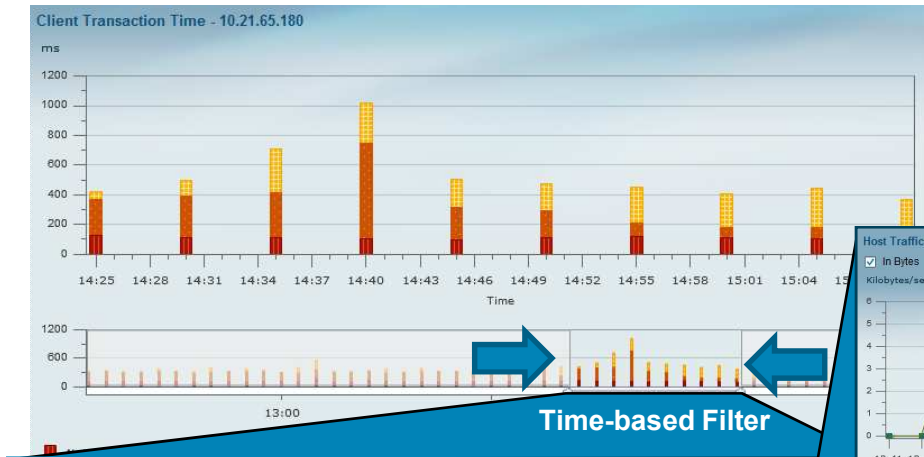
Identify the participating servers



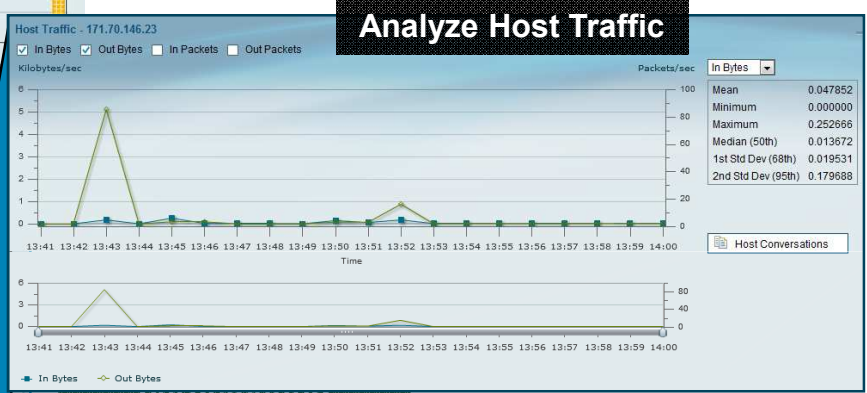
Analyze Network Key Performance Indicators

# Analysis Workflow Example

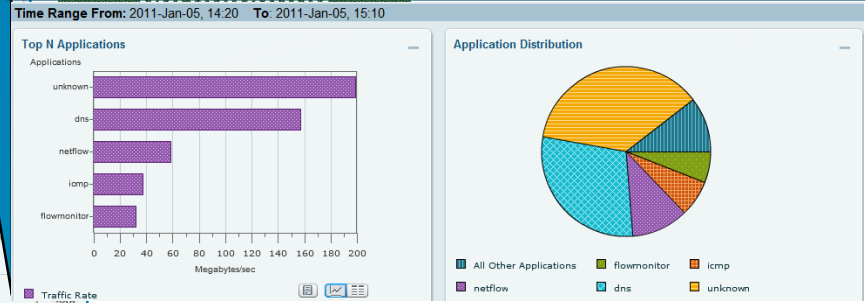
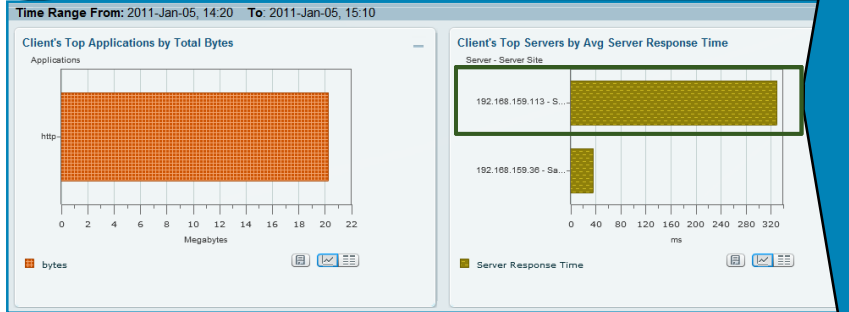
## Quickly respond to performance trouble-tickets



**Client: 10.21.65.180**  
**Application: http**  
**Reporting Time Range: Last 4 hours**  
**Site: San Jose Campus**



**Analyze Host Traffic**



**Analyze Network Key Performance Indicators**



# Eliminate virtual environment blind spots

## **NAM Visibility into Virtual Machine Network**



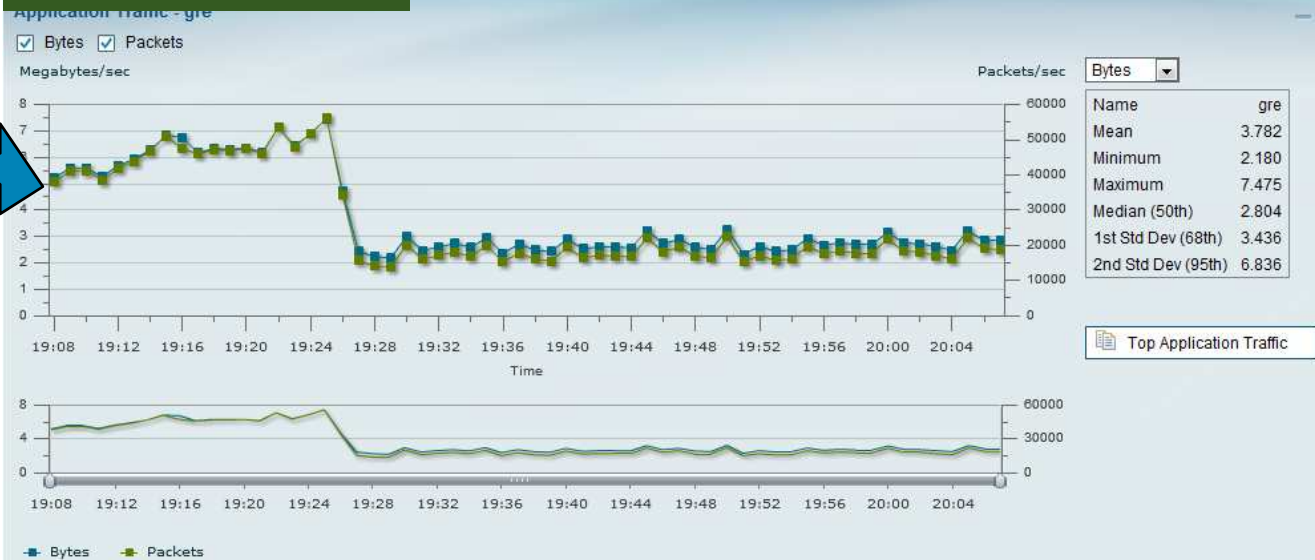
# Traffic Analysis: Applications

## Profile Application Traffic in the VM Network

### Top N Applications and Application Groups



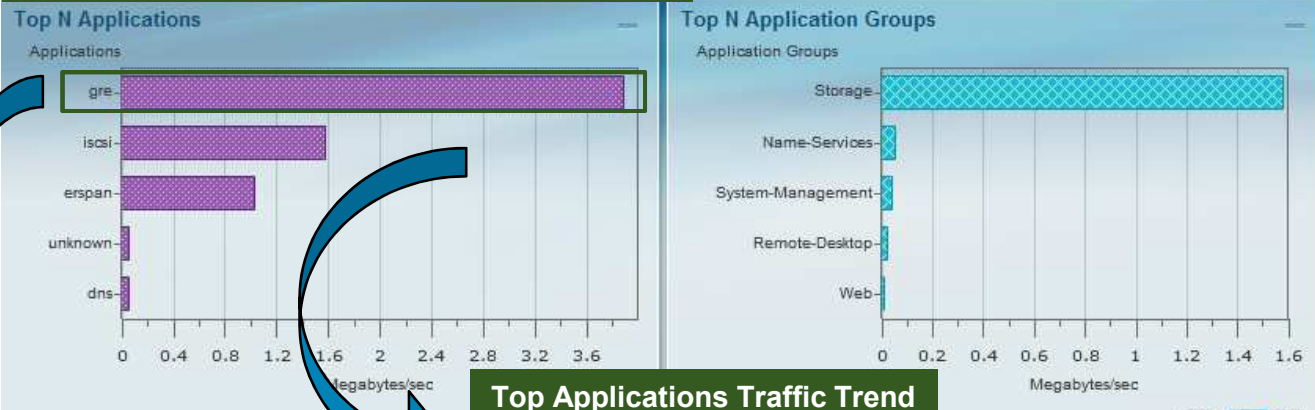
### Applications Traffic Trend



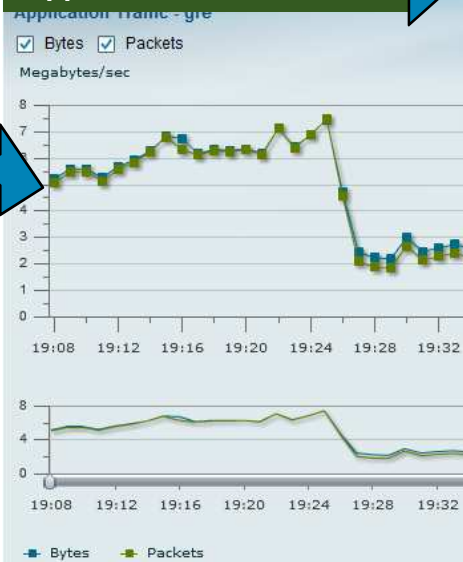
# Traffic Analysis: Applications

## Profile Application Traffic in the VM Network

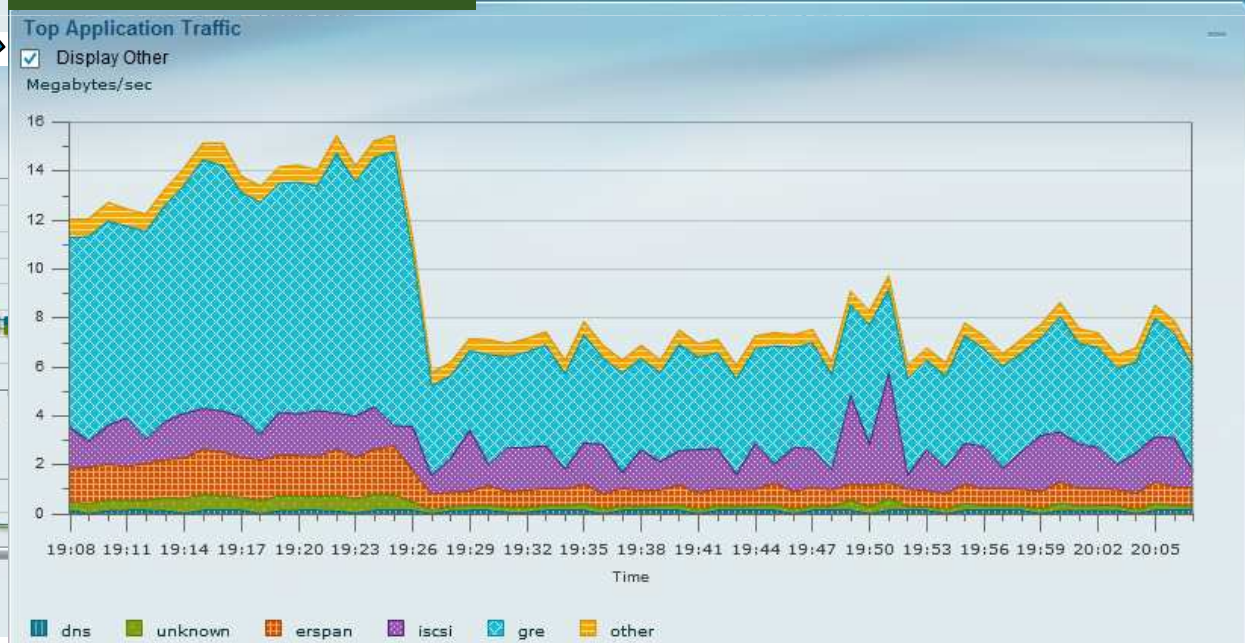
### Top N Applications and Application Groups



### Applications Traffic Trend



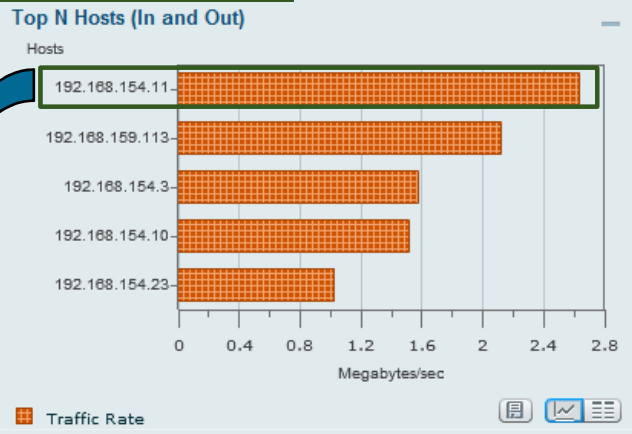
### Top Applications Traffic Trend



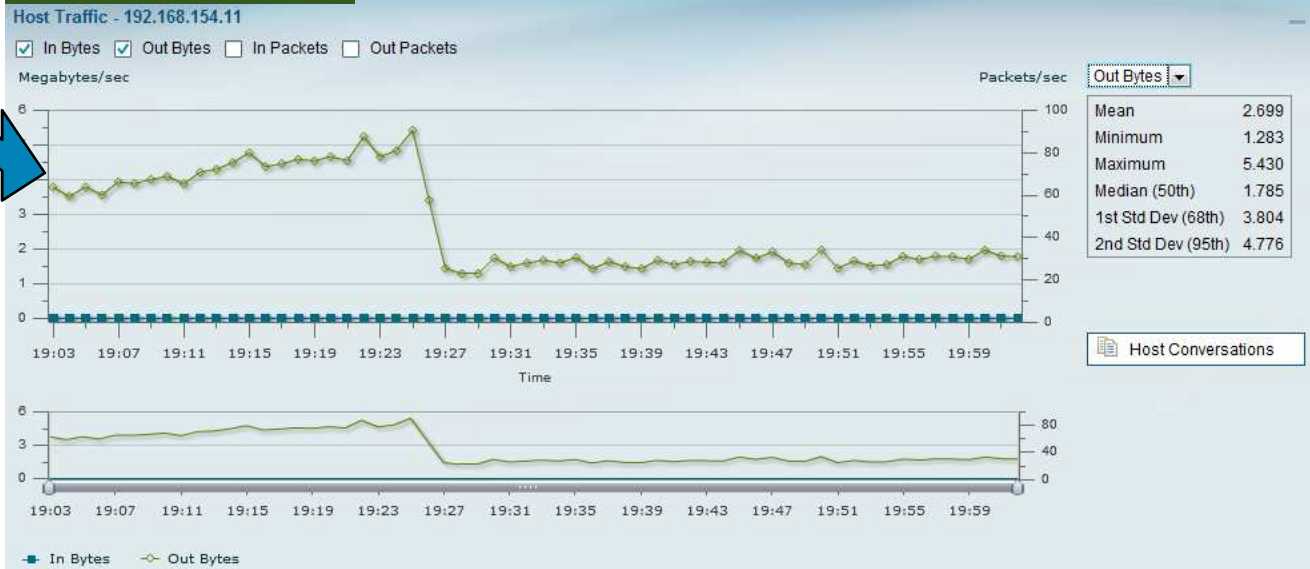
# Traffic Analysis: Hosts and Conversations

## Assess Network Resource Usage by VM or Host

### Top N Hosts/VMs

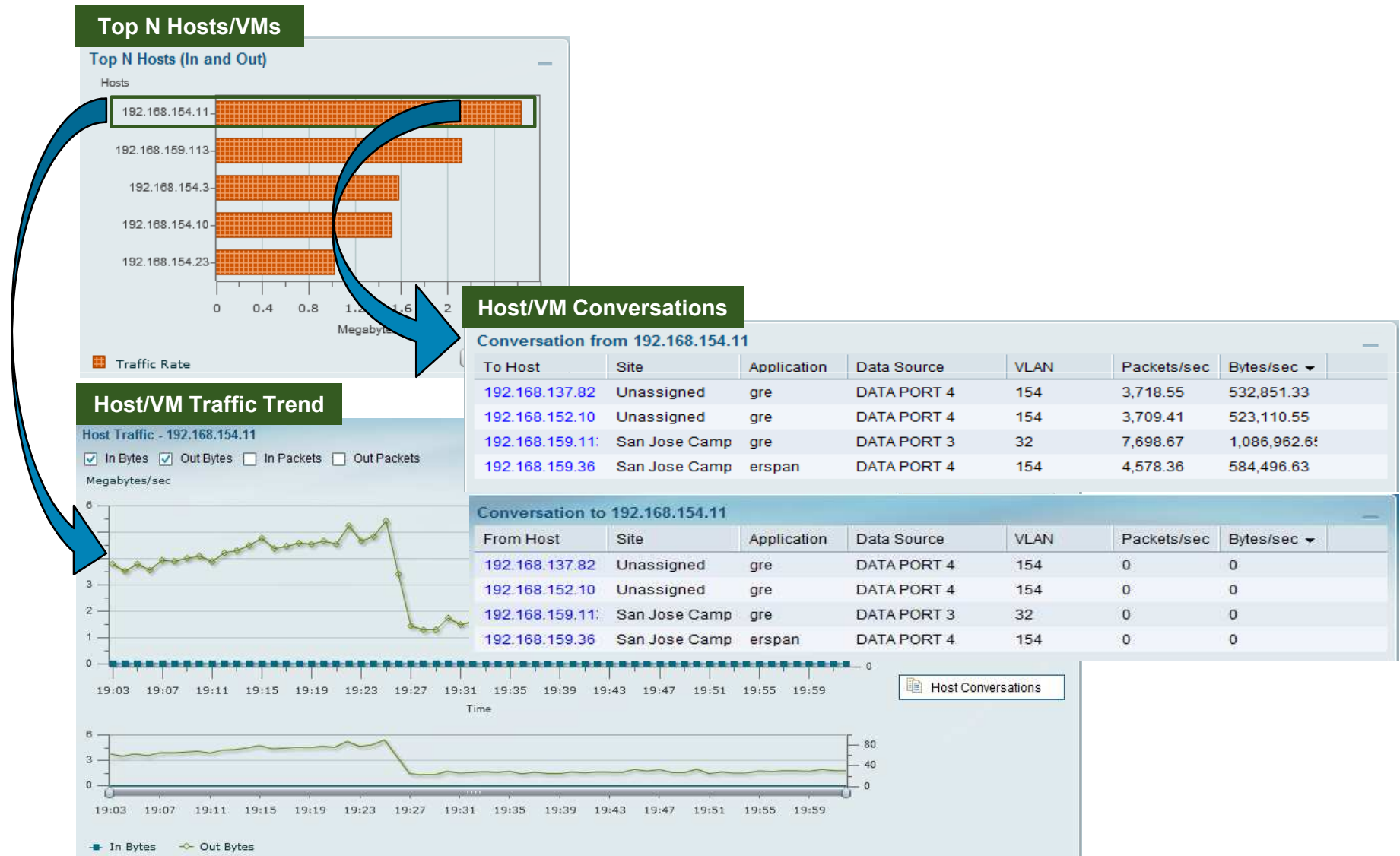


### Host/VM Traffic Trend



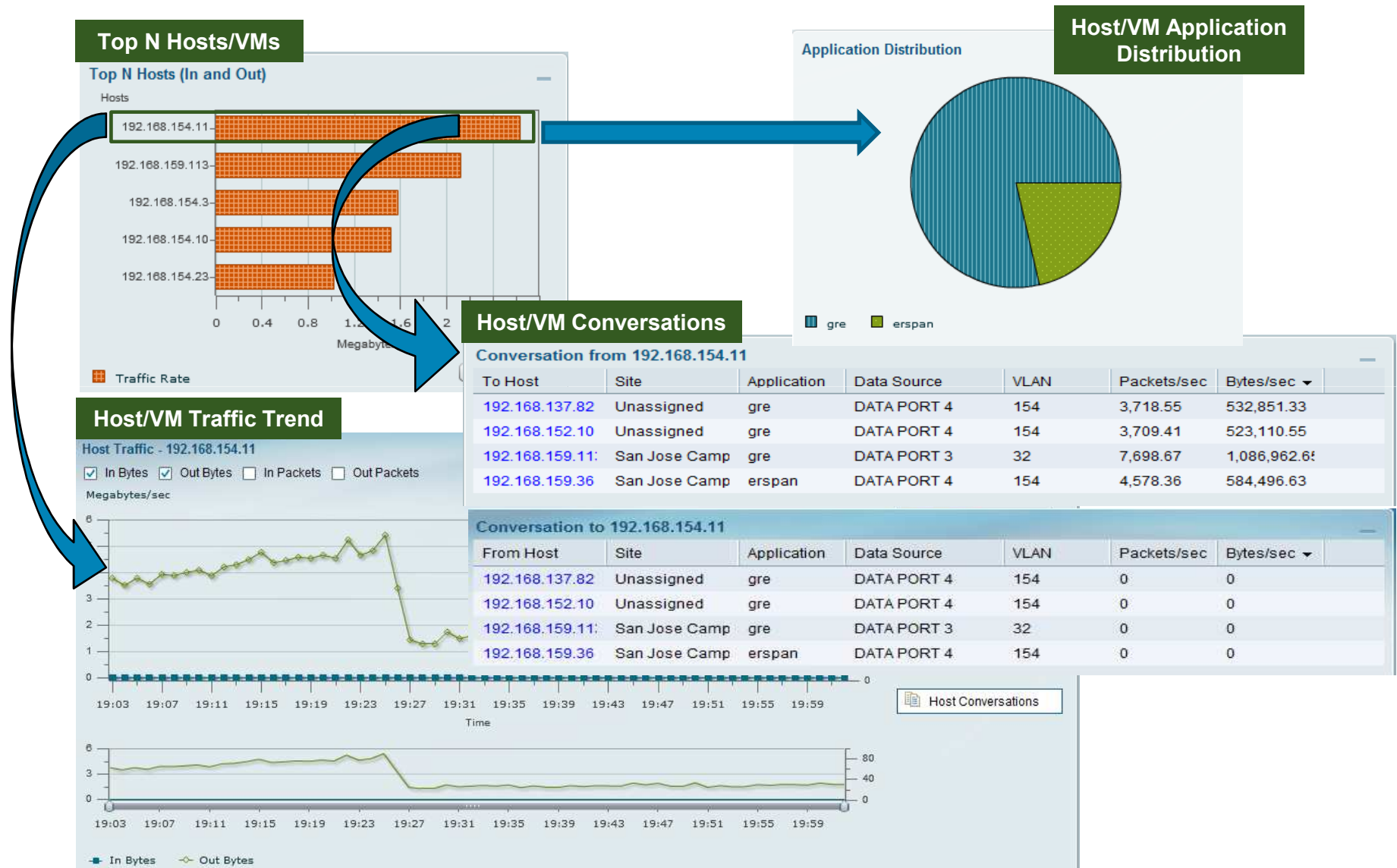
# Traffic Analysis: Hosts and Conversations

## Assess Network Resource Usage by VM or Host

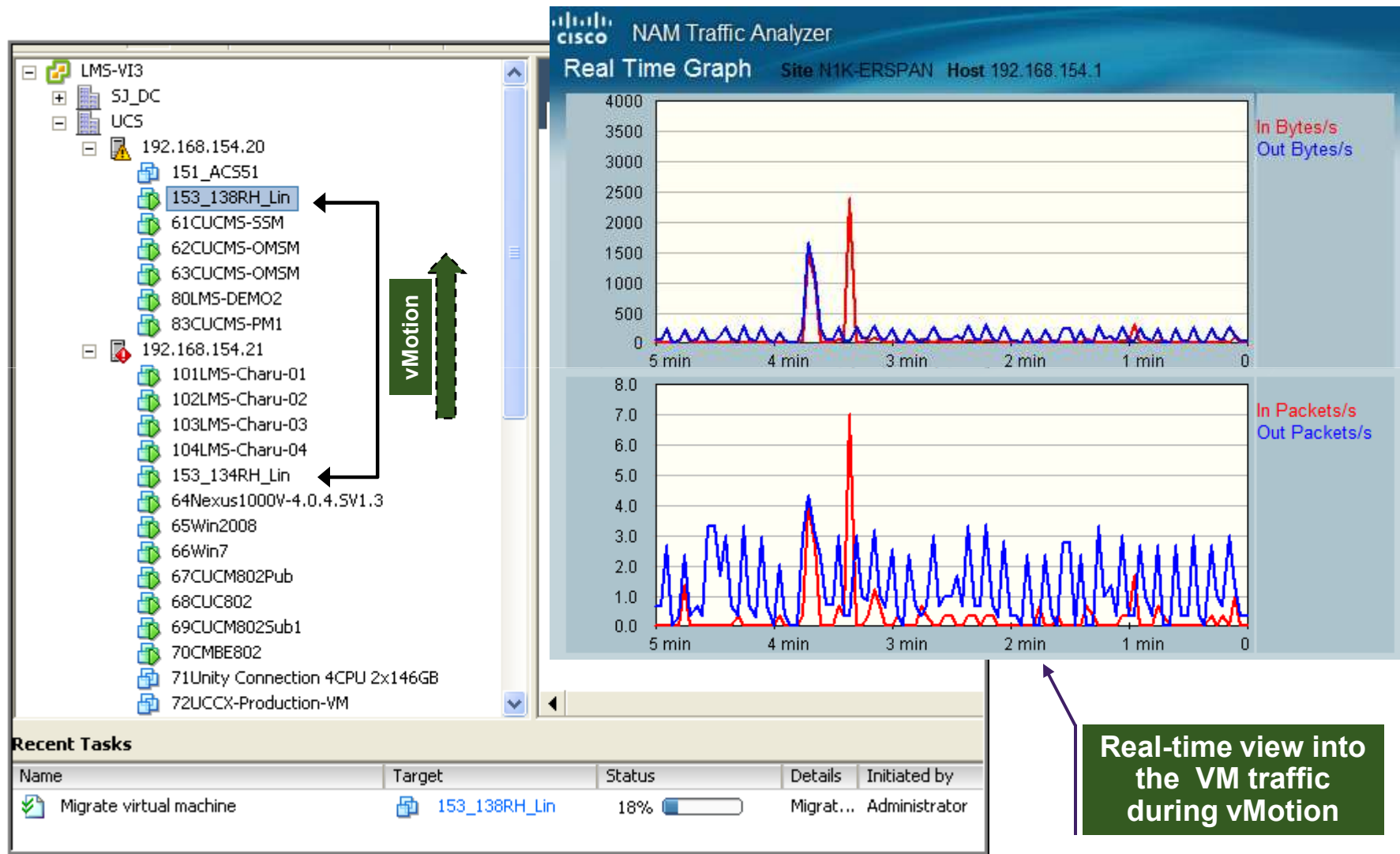


# Traffic Analysis: Hosts and Conversations

## Assess Network Resource Usage by VM or Host



# Monitor VM While being Migrated



# Validate QoS Profile

```
vsm-n1k# sh runn
version 4.0(4)SV1(3)
username admin password 5 $1$aRODmpXn$qKTOE/C6VMocT7rGuP3510 role network-admin
ntp server 171.68.10.80
ip domain-lookup
ip host vsm-n1k 192.168.154.64
kernel core target 0.0.0.0
kernel core limit 1
system default switchport
class-map type qos match-any RTP
  match ip rtp 8198
class-map type qos match-any SCCP
  description match on SCCP traffic
  match dscp 26
class-map type qos match-any Voice
  match dscp 46
policy-map type qos RTP
  class RTP
    set dscp 46
    police cir percent 15 bc 200 ms conform transmit violation
policy-map type qos Voice
  class Voice
    police cir percent 10 bc 200 ms conform transmit violation
  class SCCP
    set dscp 46
    police cir 8000 bps bc 200 ms conform transmit violation
vsm-n1k#
```

Class Maps

Policy Maps

```
interface Vethernet4
  inherit port-profile v133
  service-policy type qos input Voice
  description 153_134RH_Lin, Network Adapter 1
  vmware dvport 704
```

```
interface Vethernet16
  inherit port-profile v137
  service-policy type qos input RTP
  description 153_138RH_Lin, Network Adapter 1
  vmware dvport 1000
```

Apply the QoS policy to interface on Vethernet4 and Vethernet16



# Validate QoS Profile

Class Maps

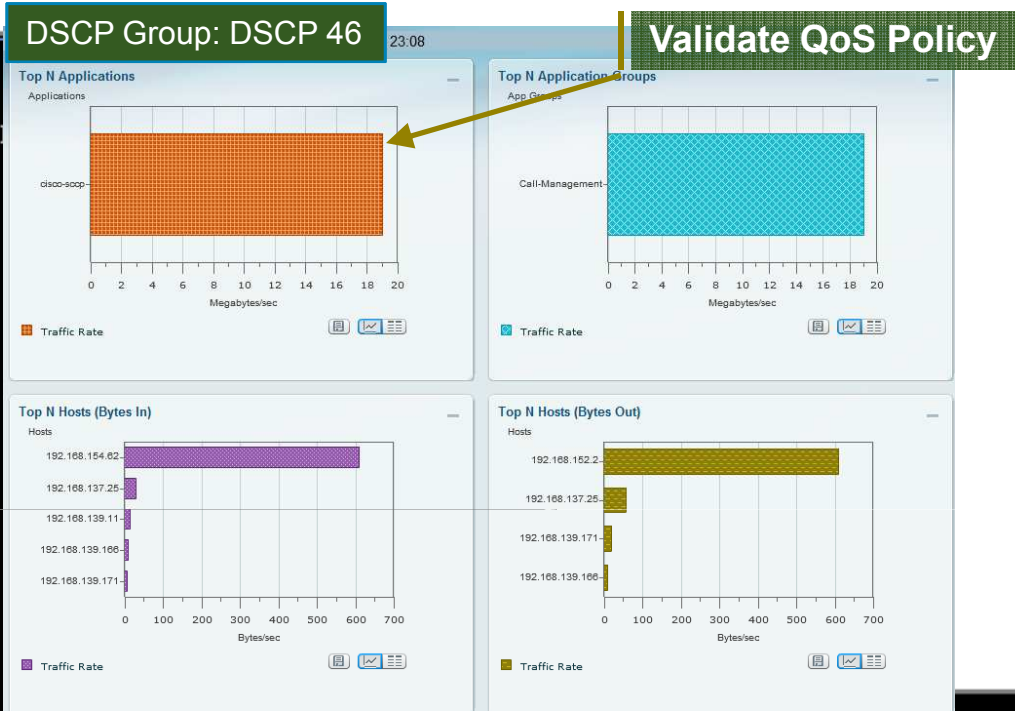
```
vsm-n1k# sh runn
version 4.0(4)SV1(3)
username admin password 5 $1$aRODmpXn$qq
k-admin
ntp server 171.68.10.80
ip domain-lookup
ip host vsm-n1k 192.168.154.64
kernel core target 0.0.0.0
kernel core limit 1
system default switchport
class-map type qos match-any RTP
  match ip rtp 8198
class-map type qos match-any SCCP
  description match on SCCP traffic
  match dscp 26
class-map type qos match-any Voice
  match dscp 46
policy-map type qos RTP
  class RTP
    set dscp 46
    police cir percent 15 bc 200 ms conform transmit vi
policy-map type qos Voice
  class Voice
    police cir percent 10 bc 200 ms conform transmit vi
class SCCP
  set dscp 46
  police cir 8000 bps bc 200 ms conform transmit viol
vsm 3
```

Policy Maps

```
interface Vethernet4
  inherit port-profile v133
  service-policy type qos input Voice
  description 153_134RH_Lin, Network Adapter 1
  vmware dvport 704
```

```
interface Vethernet16
  inherit port-profile v137
  service-policy type qos input RTP
  description 153_138RH_Lin, Network Adapter 1
  vmware dvport 1000
```

Apply the QoS policy to interface on Vethernet4 and Vethernet16

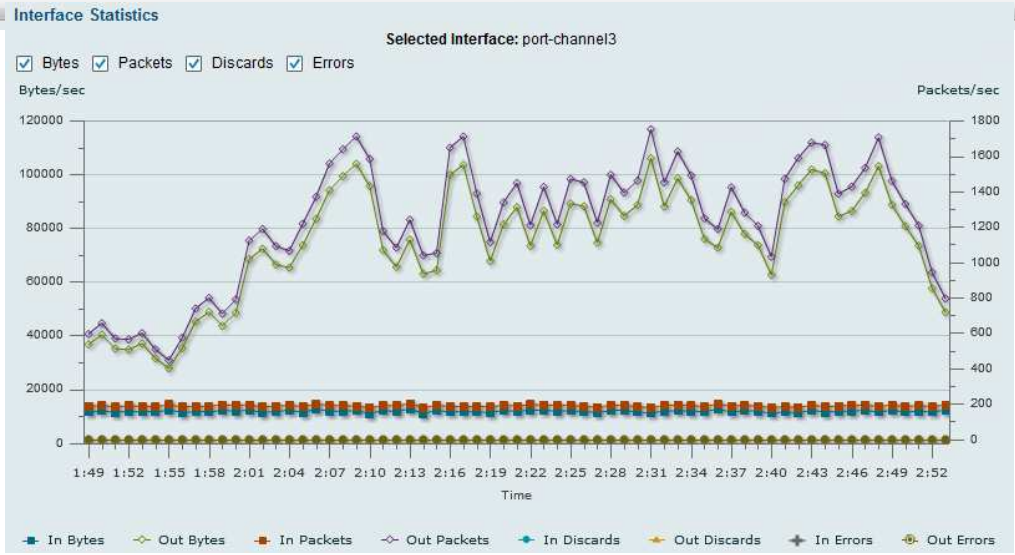


# Interface Monitoring

**Interfaces Statistics**

Filter

Interface	In % Utilization	Out % Utilization	In Packets/s	Out Packets/s	In Bytes/s	Out Bytes/s	In Non-Unicas	Out Non-Unicast	In Discards/s	Out Discards/s
Vethernet16	0	0	4,295.15	0.11	283,736.22	10.14	0.00	0.11	0	0
Ethernet4/2	0	0	1,412.16	4.72	85,597.59	1,238.02	1.65	0.02	0.13	0
port-channel2	0	0	1,412.15	4.73	85,597.19	1,238.45	1.64	0.02	0.13	0
Ethernet3/2	0	0	1,227.22	188.72	74,142.62	12,131.28	1.52	0.02	0	0
port-channel1	0	0	1,227.21	188.72	74,142.49	12,131.64	1.52	0.02	0	0
Vethernet4	0	0	479.77	0.19	76,942.69	18.86	0	0.11	0	0
Ethernet5/2	0	0	190.93	1,226.46	11,961.08	74,595.41	1.52	0.02	0	0
port-channel3	0	0	190.93	1,226.44	11,959.96	74,593.44	1.52	0.02	0	0
mgmt0	0	0	5.47	2.22	0	442.07	0	0	0	0
Vethernet17	0	0	0.50	1.80	189.53	577.32	0.01	1.30	0	0



- View traffic statistics on all interfaces of the managed device
- Drill-down into an interface to analyze data trends and patterns

# Summary

## Cisco NAM

- **Enables** quick access to critical network information
- **Simplifies** manageability
- **Delivers** a common instrumentation across Cisco solution architectures
- **Preserves** investment into existing management assets

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With the NAM 5.0 Software release, Cisco's solution is taking big strides in both sophistication and maturity, adding substantial monitoring and troubleshooting features to its existing strengths in application-aware network performance analysis

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**Jim Frey**

**Enterprise Management  
Associates, Inc.**

# For More Information

## Product Details:

- Cisco Prime NAM on Nexus 1010:  
<http://www.cisco.com/go/1000nam>
- Cisco NAM Product Family:  
<http://www.cisco.com/go/nam>

Questions: [nam-info@cisco.com](mailto:nam-info@cisco.com)



# Virtual WAAS Product Overview

## **Product Manager**

Vijay Iyer – Application Network Services



# WAN Optimization

## Key Market Drivers



### IT Consolidation

- Centralize IT while maintaining SLAs
- Virtualized branch services

### WAN Optimization

- Bandwidth optimization
- Enhanced resiliency

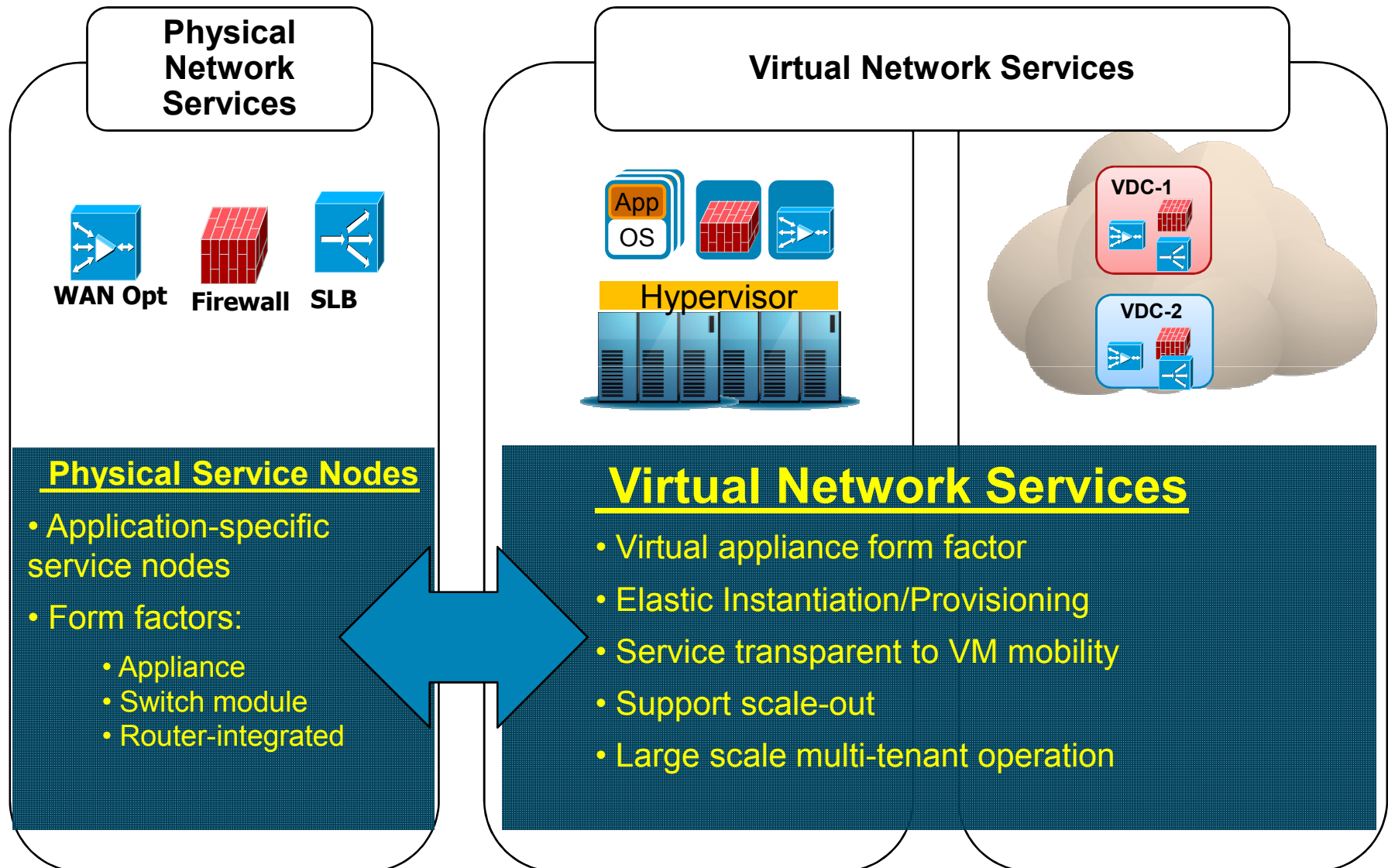
### Faster Applications

- User Productivity
- Remote/mobile users

# Centralized Applications need WAAS

Category	Applications	2X	5X	10X	25X	50X	100X+	
File Sharing	CIFS NFS	2-20X Avg			>100X Peak			
Email	Microsoft Exchange Lotus Notes Internet Mail	2-10X Avg		50X Peak				
Web and Collaboration	HTTP WebDAV FTP Microsoft Sharepoint	2-10X Avg		100X Peak				
Software Distribution	Microsoft SMS Altiris HP Radia	2-20X Avg			>100X Peak			
Enterprise Applications	Oracle, Siebel, SAP CRM ERP	2-8X Avg	20X Peak					
Backup Applications	Microsoft NTBackup Legato Networker Veritas Netbackup CommVault Galaxy	2-10X Avg		50X Peak				
Data Replication	EMC SRDF/A EMC IP Replicator NetApp SnapMirror Data Domain Double-Take Veritas Vol Replicator	2-10X Avg		50X Peak				
SaaS Applications	Cisco WEBEX SFDC	2-8X Avg	20X Peak					

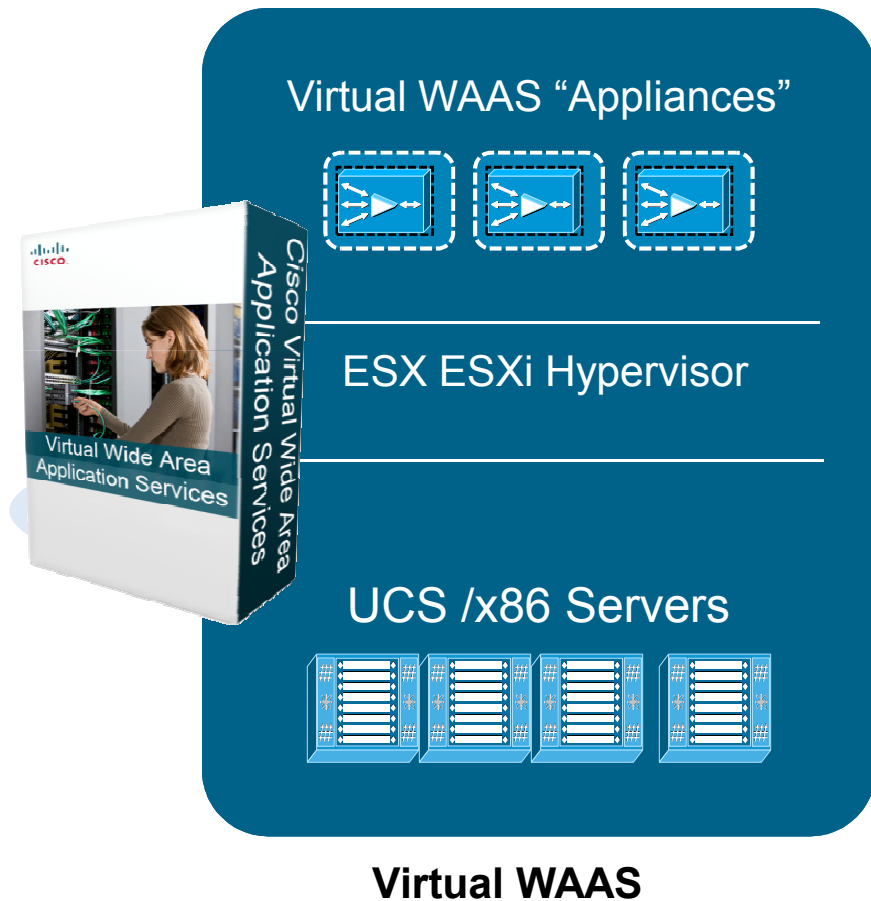
# Key Requirements for Services Virtualization in Cloud





# Cisco Virtual WAAS

## Cloud-ready WAN Optimization



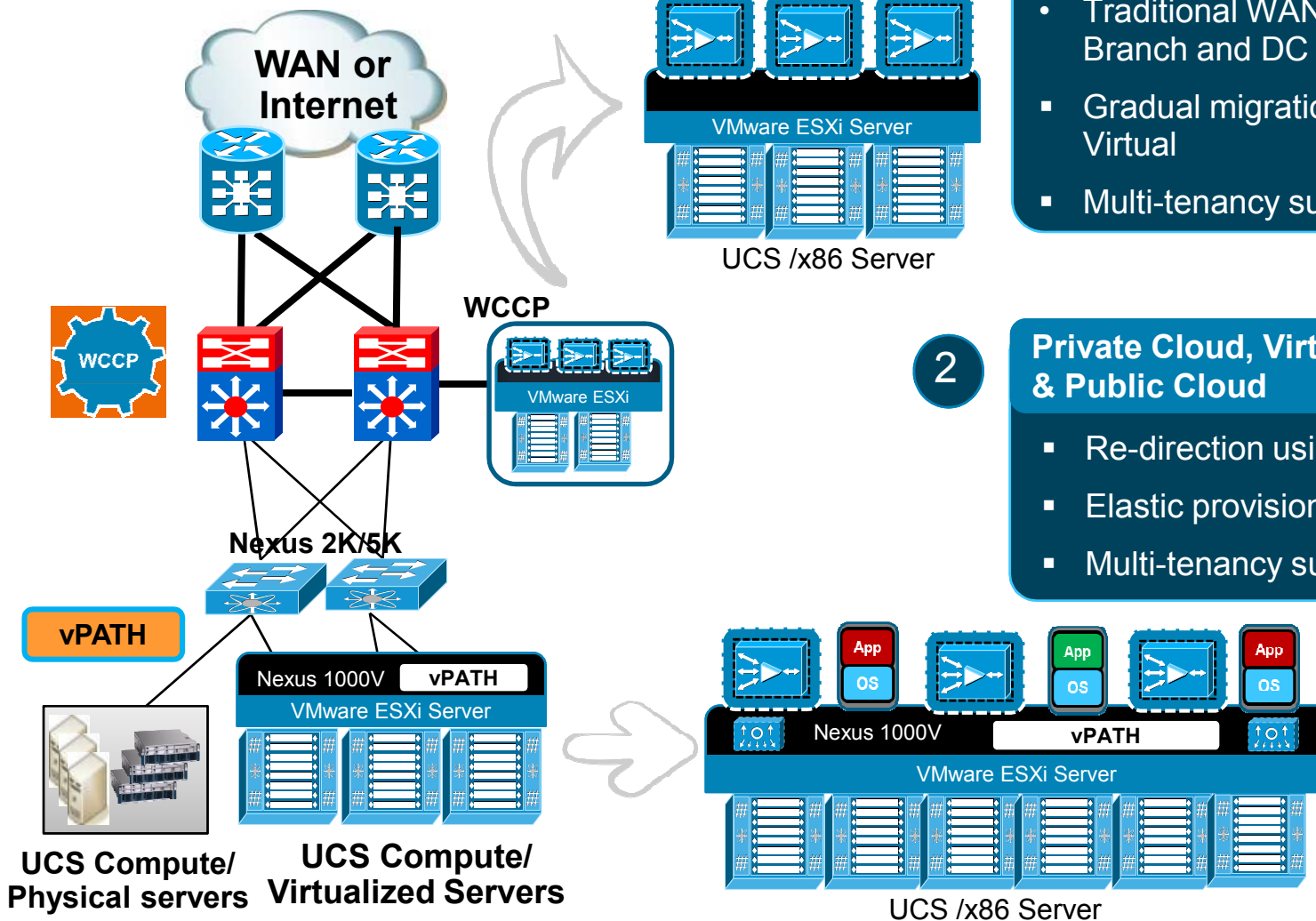
### FEATURES

- Elastic multi-tenancy with virtual machine mobility awareness
- SAN storage for Data Redundancy Elimination
- Policy-based management

### BUSINESS BENEFITS

- Business Agility with on-demand orchestration
- Lower operational cost, reduced migration risk
- Fault-tolerance with VM mobility awareness

# Cisco vWAAS Provides Flexible Cloud Deployment Options



1

## Private Cloud

- Traditional WAN Edge Deployment at Branch and DC
- Gradual migration from Physical to Virtual
- Multi-tenancy support

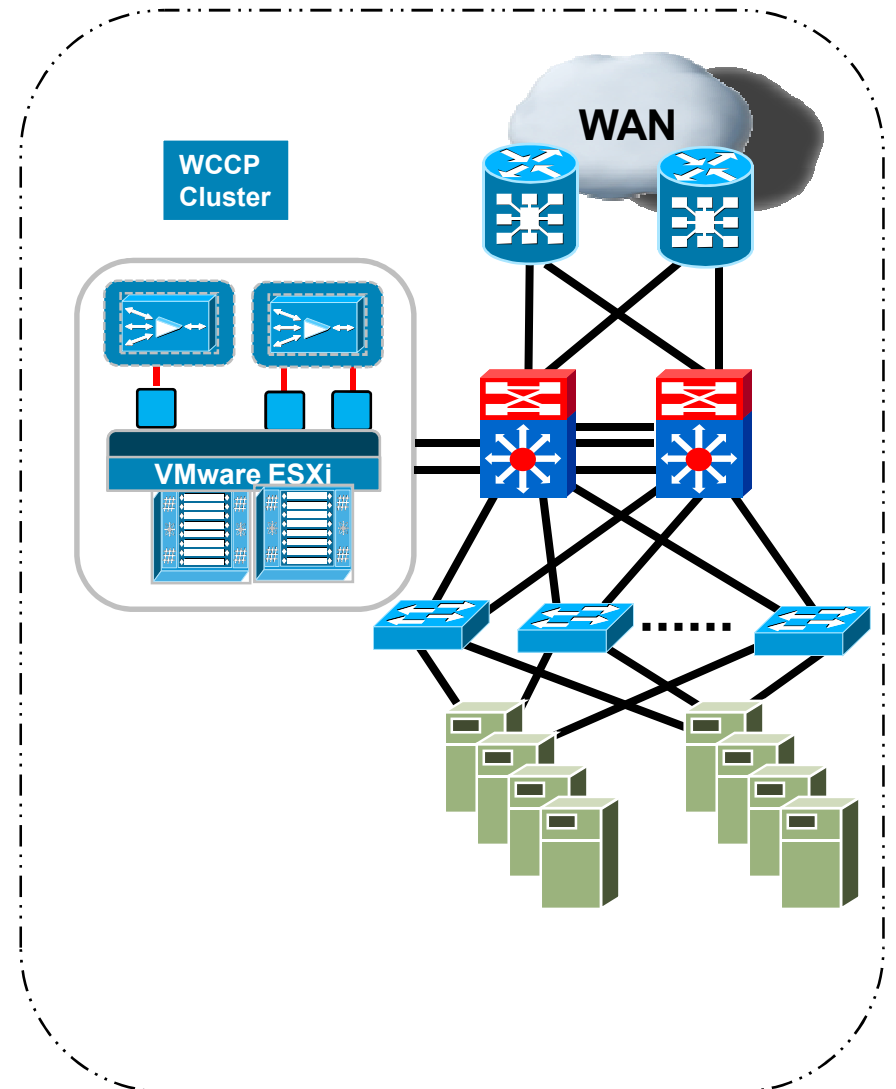
2

## Private Cloud, Virtual Private Cloud, & Public Cloud

- Re-direction using vPath @VM level
- Elastic provisioning
- Multi-tenancy support

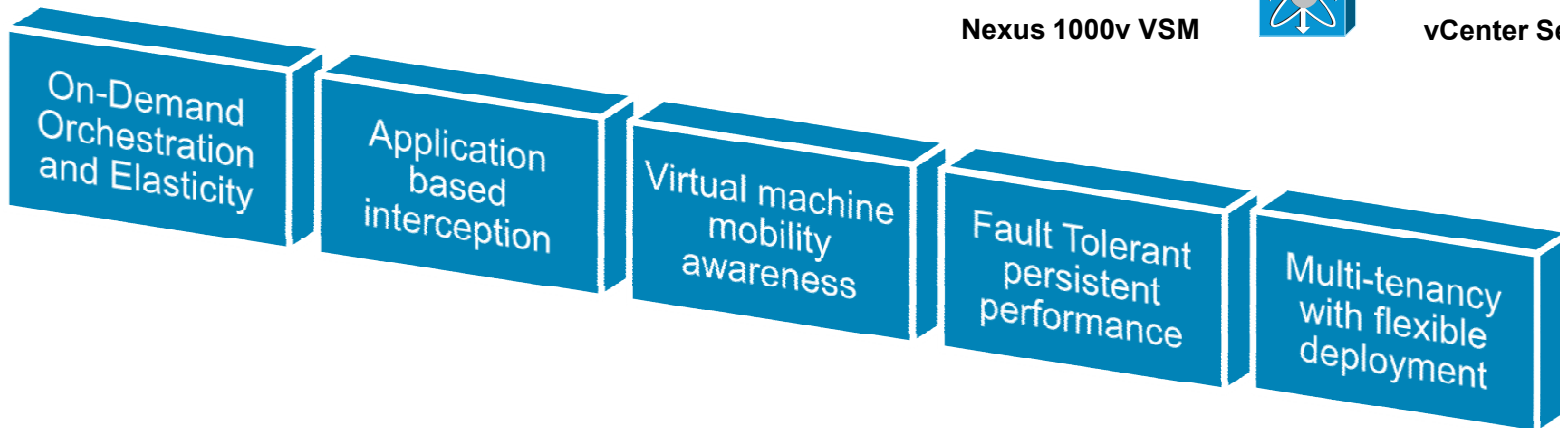
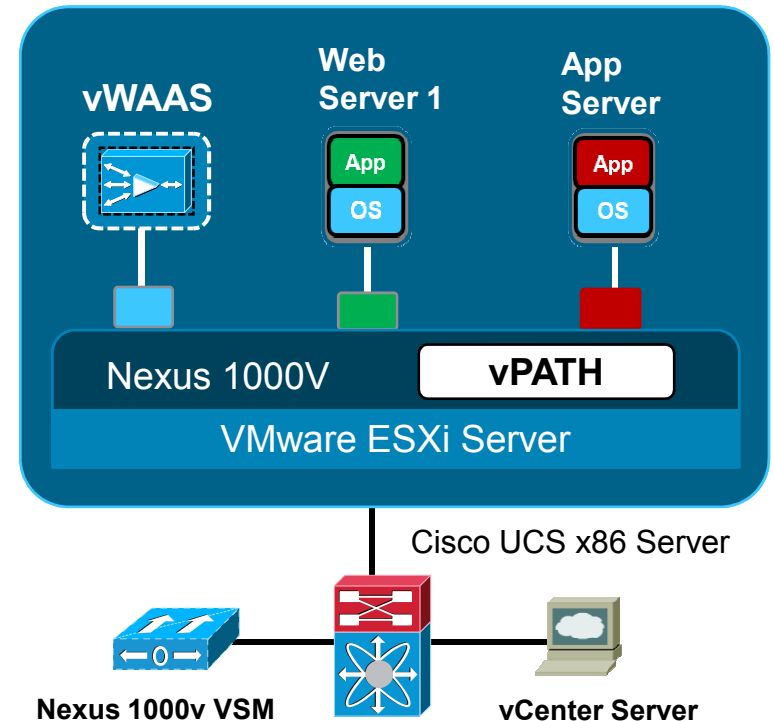
# Virtual WAAS: WCCP-based Interception

- WCCP continue to work similarly as physical appliance
- Multiple vWAAS VMs can be clustered in same WCCP cluster.
- Both physical and virtual WAE can be part of same cluster
- WCCPv2 Interception
  - Active/active clustering
  - Automatic load-balancing

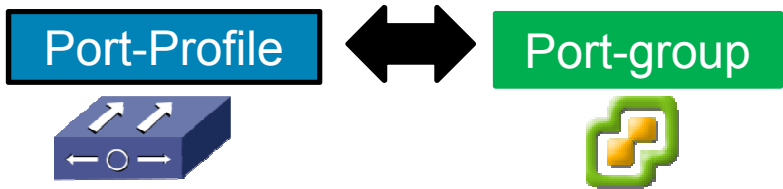


# Virtual WAAS: vPATH Interception (Nexus 1000V)

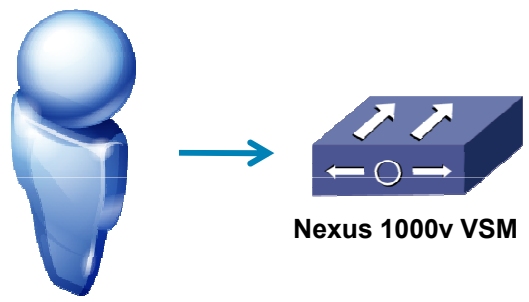
- Interception based on port-profile policy configured in Nexus 1000v
- **Bidirectional Interception** - (no IN/OUT configuration)
- **Pass-through traffic automatic bypass**



# Virtual WAAS respects administration boundaries for server and network teams



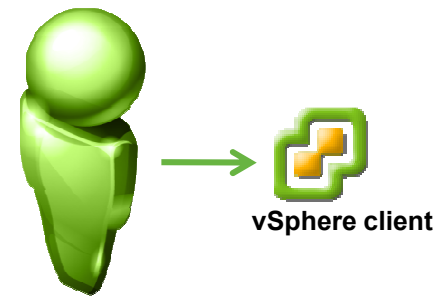
## Network Admin view



```
port-profile type vethernet Opt-Exchange-Server
vmware port-group
switchport mode access
switchport access vlan 3185
vn-service ip-address 2.8.2.90 vlan 3002 mgmt-ip-address 2.8.2.90 fail open
no shutdown
state enabled
```

**vPATH interception**

## Server Admin view



**Attach Opt-port-profile to server VMs**

Network adapter 1	VM-Data (N1Kv-VPC), ...
SCSI controller 0	LSI Logic SAS
Hard disk 1	Virtual Disk

Network Connection configuration:

- Network label: VM-Data (N1Kv-VPC)
- n1kv-system-management (N1Kv-VPC)
- n1kv-system-packet (N1Kv-VPC)
- vWAAS-Network (N1Kv-VPC)
- ISCSI (N1Kv-VPC)
- VM-Data (N1Kv-VPC)
- Service-Console (N1Kv-VPC)
- Exchange-Server (N1Kv-VPC)
- Opt-Exchange-Server (N1Kv-VPC)

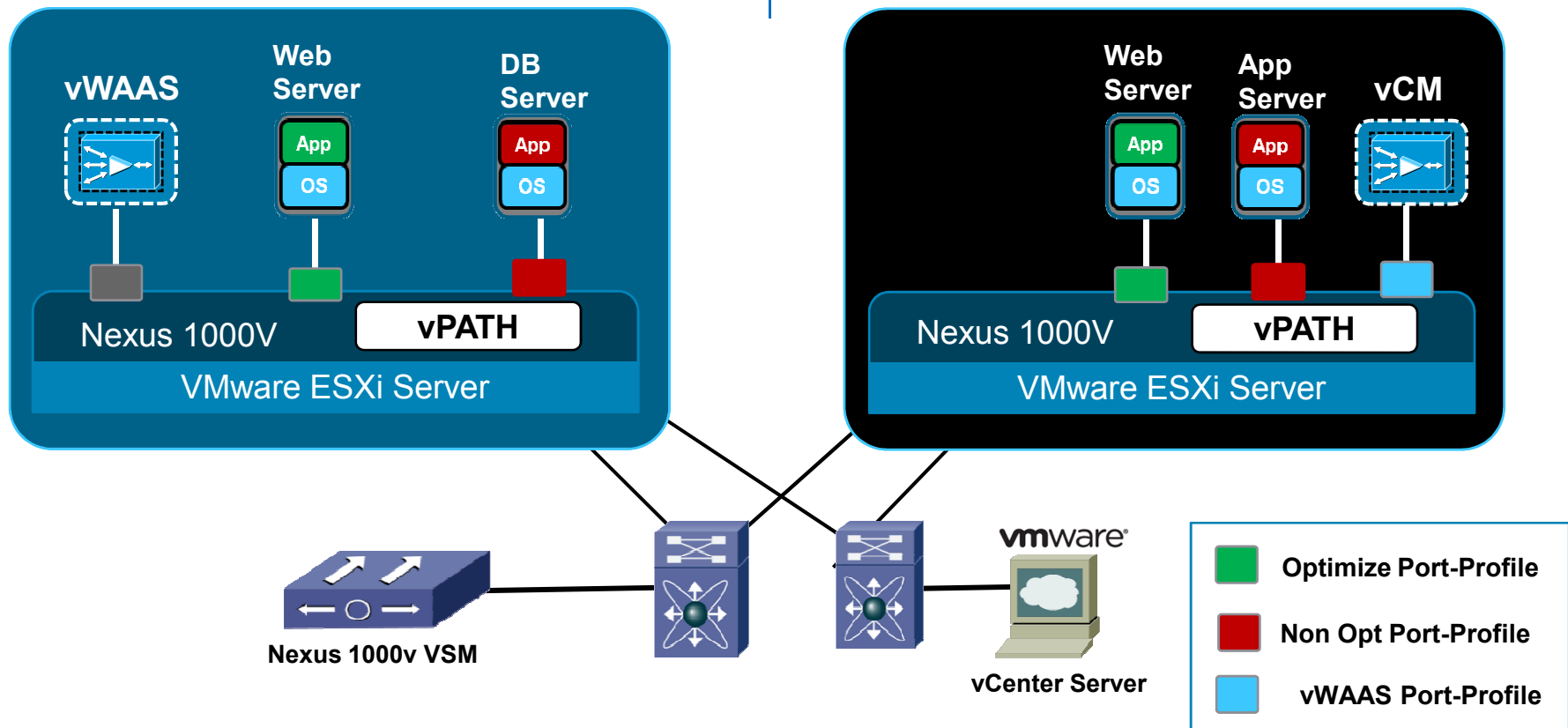
# Virtual WAAS: On-demand orchestration using policy-based configuration

## Feature

1. Optimization based on the port-profile policy configured in Nexus 1000V
2. Policy gets propagated to vCenter automatically

## Benefit

1. Provide on-demand service orchestration in the cloud without network disruption



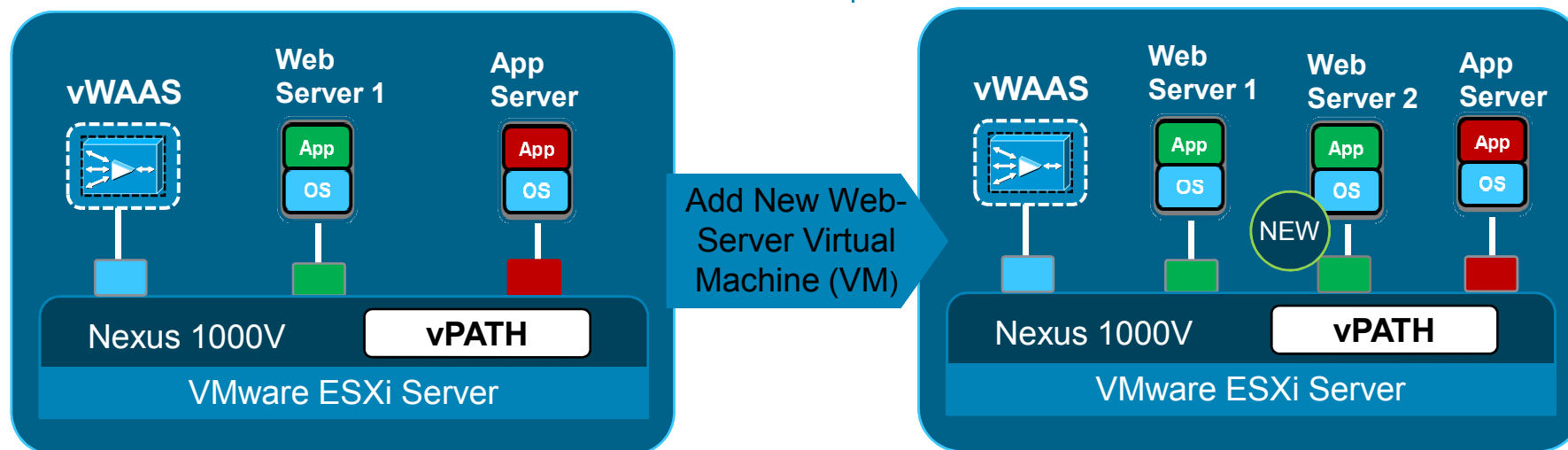
# Virtual WAAS: Elastic WAN Optimization Service

## Feature

1. Automatic application of vWAAS service when a new 'Web Server' VM gets provisioned
2. vWAAS services associated with 'Web server' VMs using Nexus 1000V policies

## Benefit

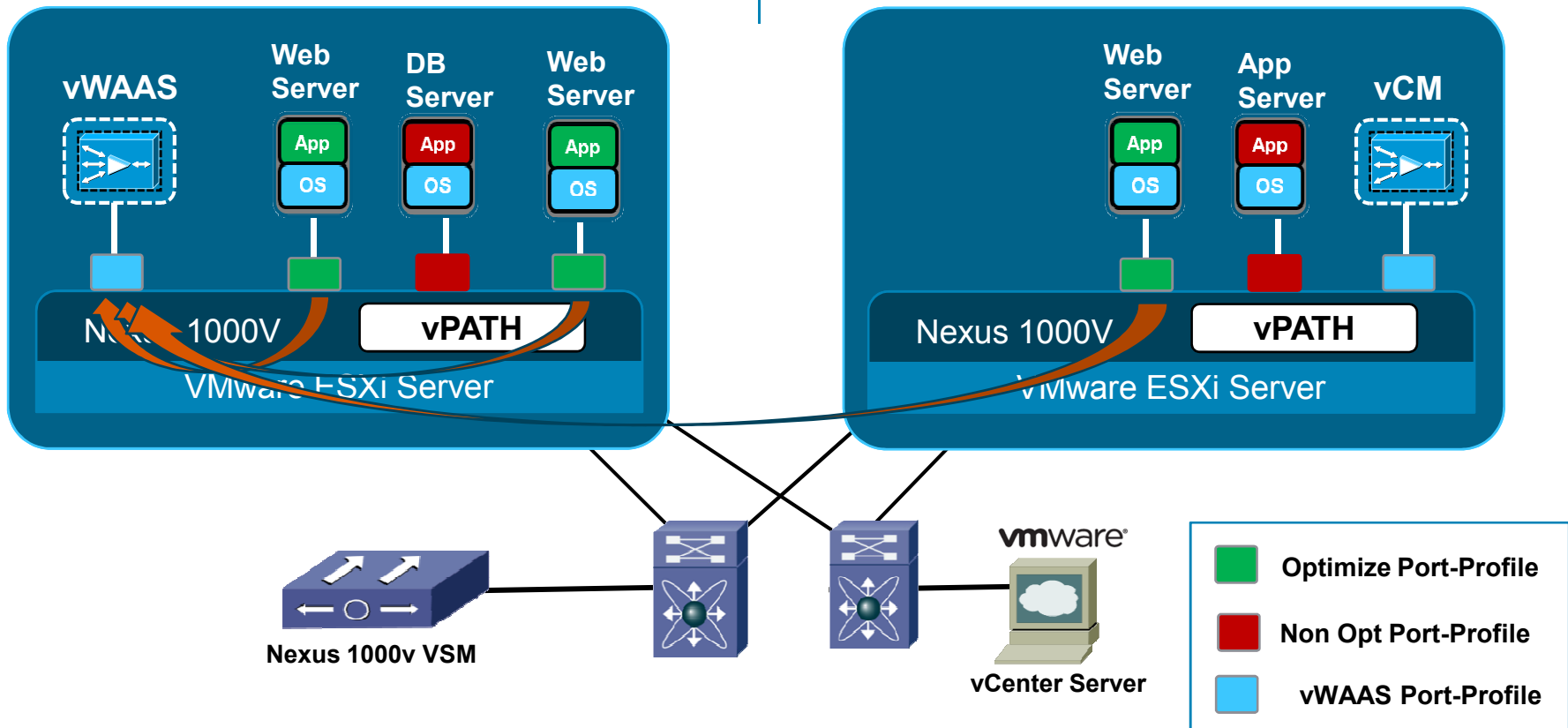
1. Elastic vWAAS deployment
2. Scale-out Virtual Web Server farm by provisioning additional VMs while applying WAN optimization



# Virtual WAAS: Transparent to server-VM mobility

## Feature

1. vPATH aware of movement of VM from one host to another.
2. Traffic interception continue to work as-is without any disruption or changes required.





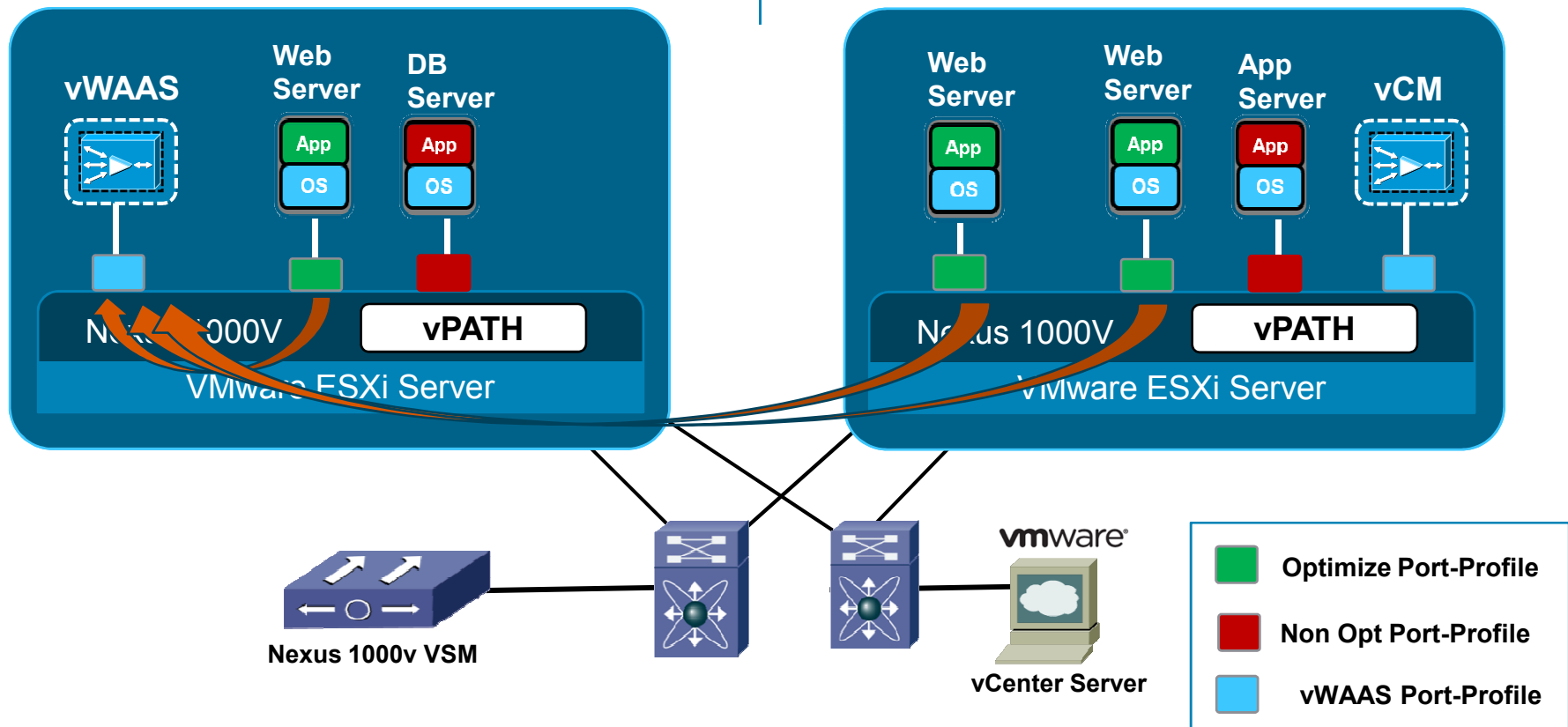
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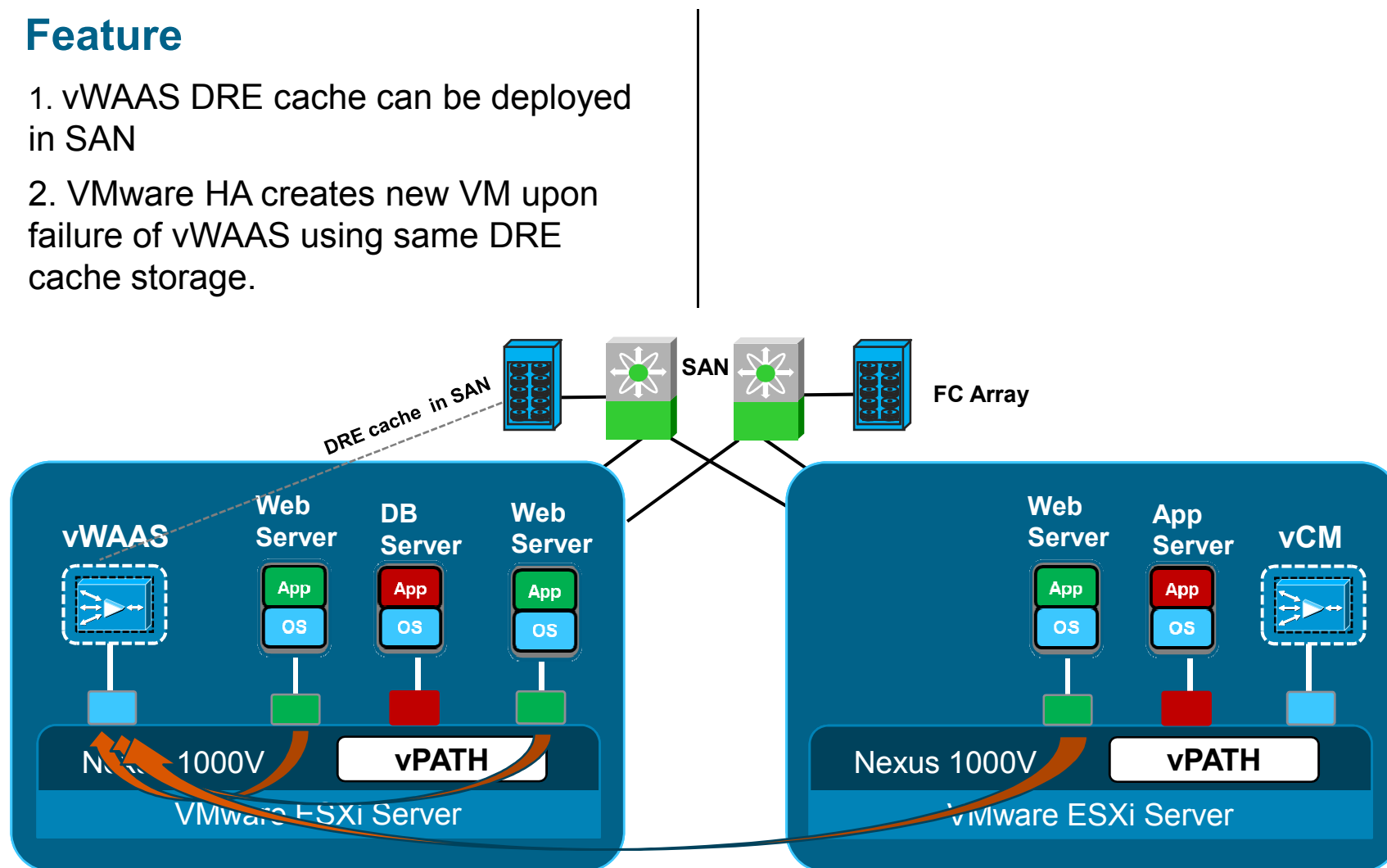
1. No disruption in WAN optimization service if VM moves from one host to another.
2. Support VMware resources scheduling (DRS) and provides High availability



# Virtual WAAS: Fault tolerant persistent performance

## Feature

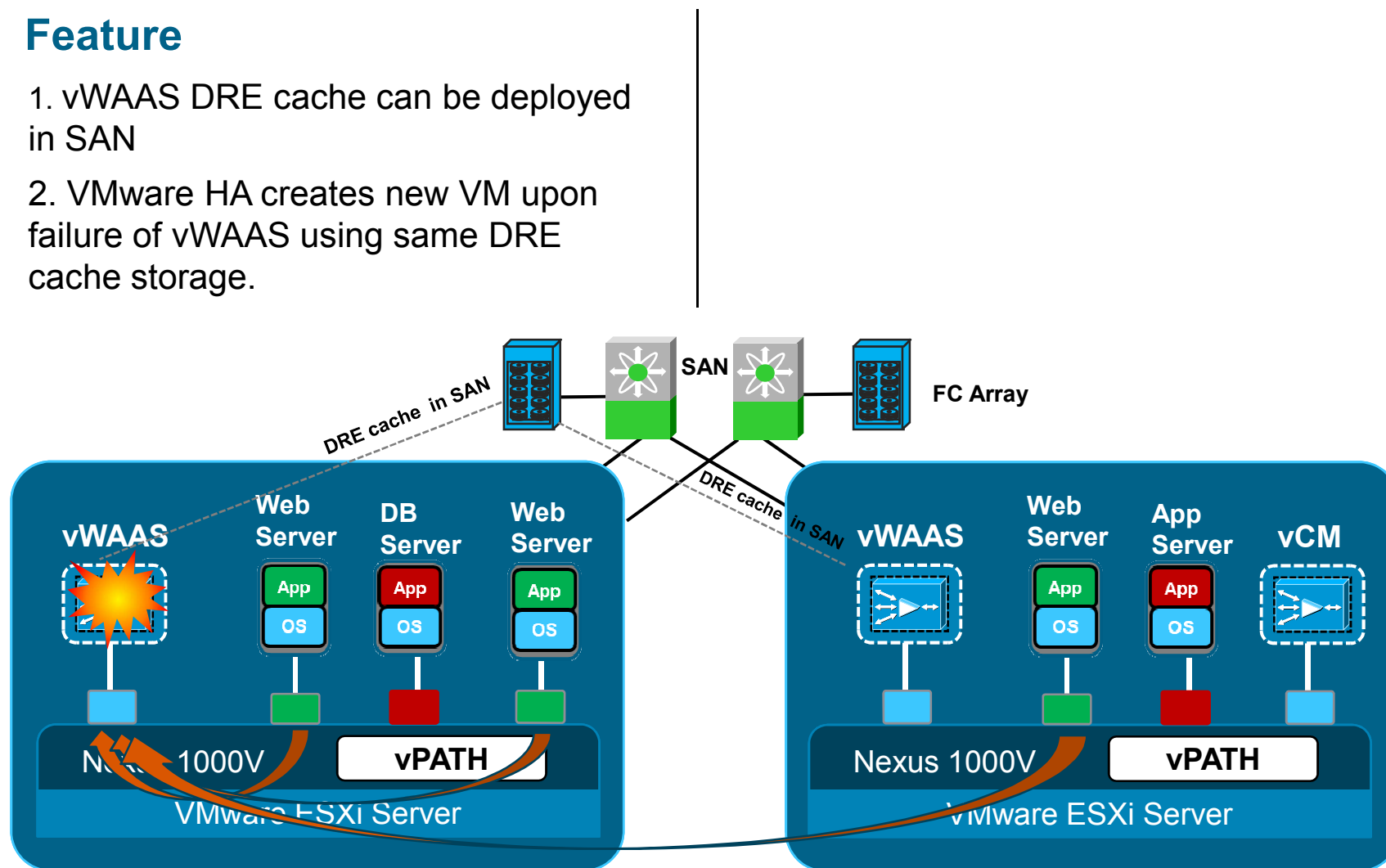
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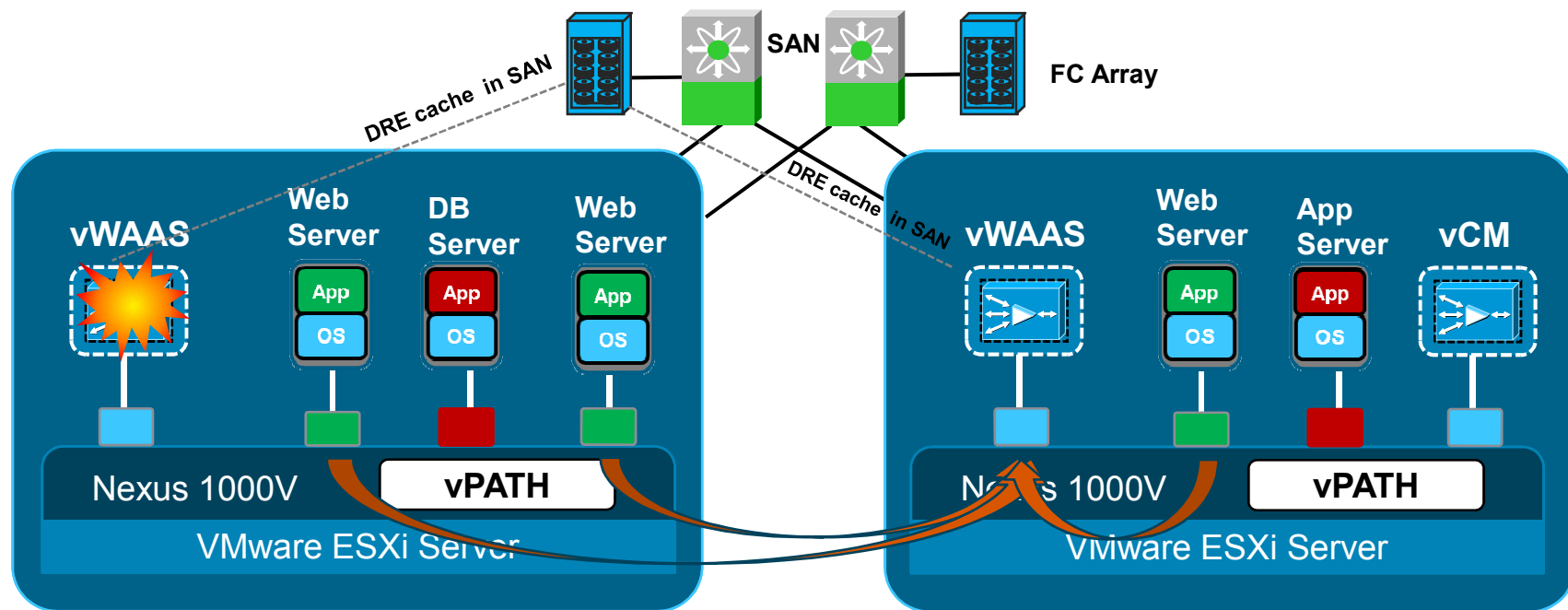
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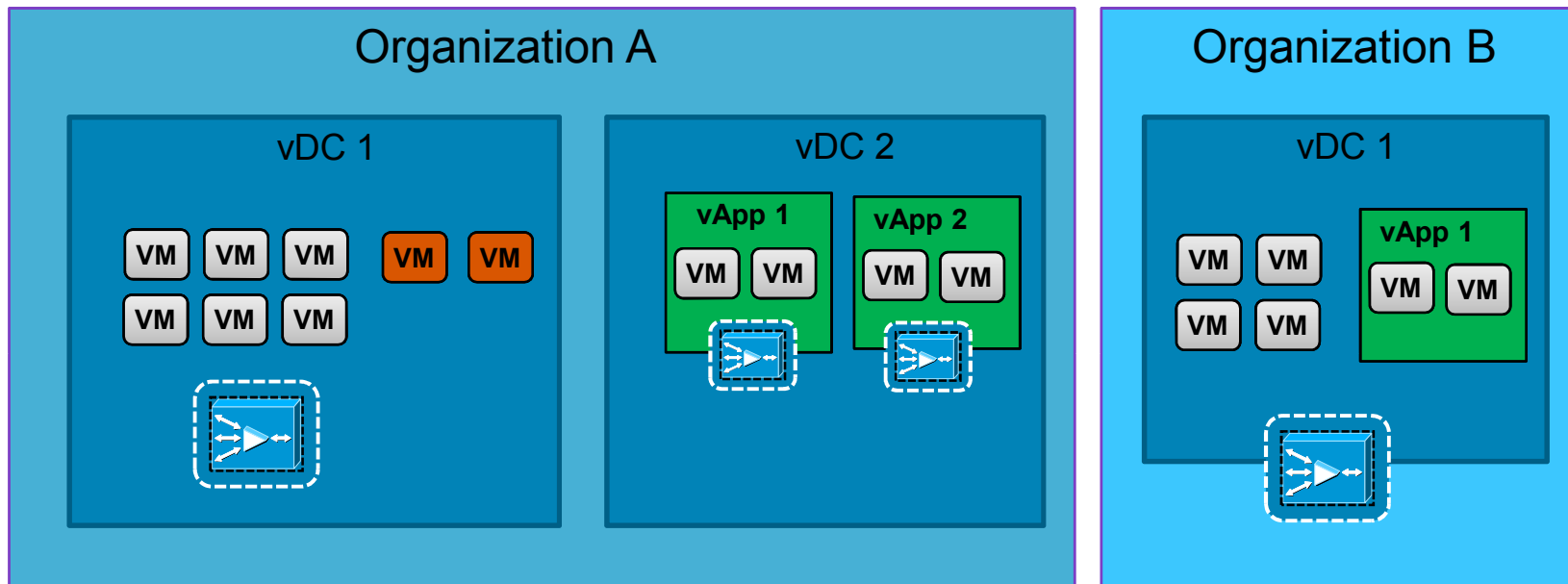
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## Benefit

1. Ensures cache preservation and high persistent performance in the event of failure
2. Provide uninterrupted compression benefit of WAN optimization



# Virtual WAAS: Multi-tenancy deployment options



## Nexus 1000V Distributed Virtual Switch

Cisco vWAAS can be deployed at:

- Organization level, vDC level, vApp level

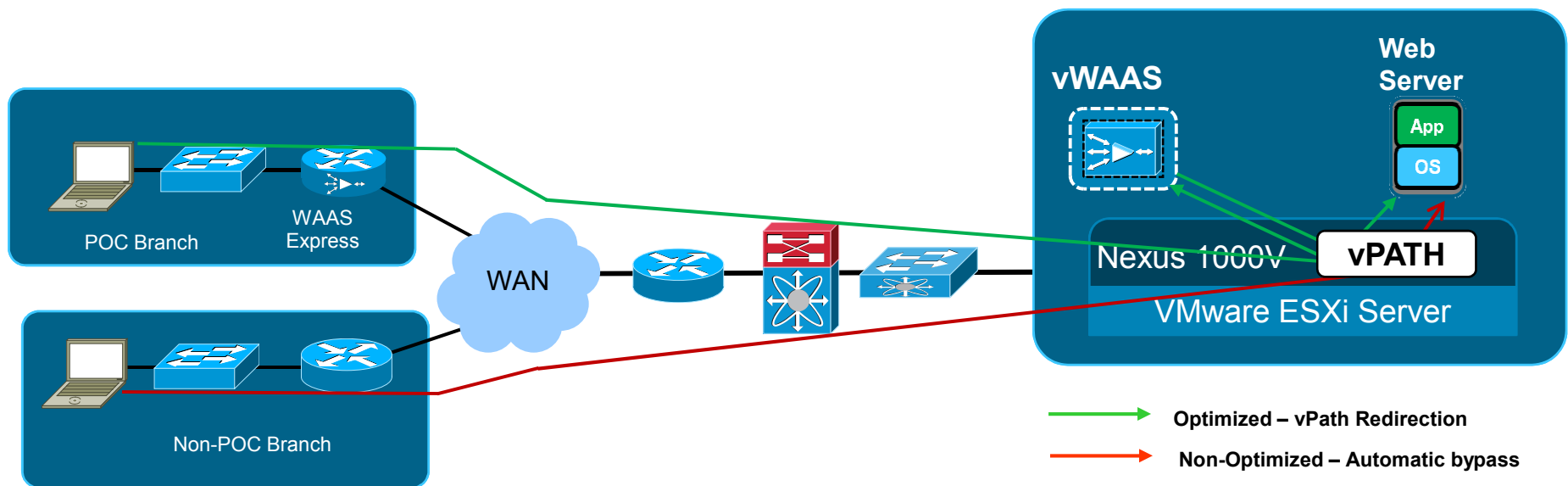
# Virtual WAAS: “Offload” feature provides higher scale

## Feature

1. vWAAS send “offload” to vPATH for non-interesting traffic (inter-server traffic or no-peer traffic)
2. vPATH provide automatic bypass of these traffic

## Benefit

1. Facilitating PoC use case, no configuration required
2. High scale with automatic application or port-profile based traffic filtering



# Cisco vWAAS: Cloud-Ready WAN Optimization

## Key Requirements

- Agile deployment
- Elastic scale-out
- Minimal network configuration with increasing scale
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- On-demand orchestration
- Policy-based network configuration provide elasticity
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## Cisco Advantages

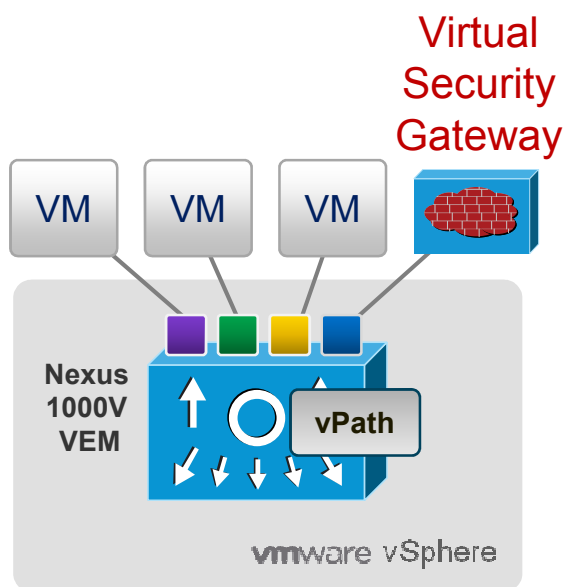
- Easy WAN Op deployment for cloud
- On-Demand, policy-driven makes it truly cloud-ready.
- Tight integration with Cisco Nexus 1000V
- 'Offload' feature provides higher scale
- Validated performance with Cisco UCS servers de-risks your cloud journey

## Virtual WAAS: Resources + Call to Action

- WhitePapers on Cisco.com
  - [Cloud-Ready WAN Optimization](#)
  - [Virtual WAAS: Technical Overview](#)
- Virtual WAAS Deep-Dive (Webinar on Bright Talk)  
<http://www.brighttalk.com/webcast/25586>
- Reach out to your local Cisco Account Teams for evaluation needs.

# Cisco Virtual Security Gateway

Upcoming sessions on April 19<sup>th</sup> & 26<sup>th</sup>



- Trusted segmentation
  - Zone-based control and monitoring
  - Policies are VM aware
  - Multi-Tenant Environments
- Dynamic operation
  - On-demand provisioning
  - Security policy follows vMotioned VM
- Non-disruptive administration for Virtualization, Security, and Network Teams



Sign up at: <http://tinyurl.com/1000v-webinar>

Date	Business Sessions
22-Mar	Nexus 1000V Family Overview and Update
5-Apr	Virtual Network Services (vPath, vWAAS, NAM)
19-Apr	Virtual Security Gateway Introduction
3-May	Journey to the Cloud w/ N1KV: vCloud Director & Long Distance vMotion
17-May	Secure VDI with Nexus1000V & VSG

Date	Technical Sessions
29-Mar	Nexus 1000V New Features and Installation Overview
12-Apr	Nexus1010 Installation & Upgrade
26-Apr	Virtual Security Gateway Installation and Basic Configuration Overview
10-May	Nexus 1000V Advanced Configuration
24-May	Nexus 1000V Troubleshooting

### Web Sites

[www.cisco.com/go/1000v](http://www.cisco.com/go/1000v)

[www.cisco.com/go/nexus1010](http://www.cisco.com/go/nexus1010)

[www.cisco.com/go/vsg](http://www.cisco.com/go/vsg)

[www.cisco.com/go/vnmc](http://www.cisco.com/go/vnmc)

[www.cisco.com/go/1000vcommunity](http://www.cisco.com/go/1000vcommunity)  
 (Preso and Q&A posted here)

Thank you.

